A DISCOVRSE OF THE ROMANE FOOT, AND *DENARIVS*:

From whence, as from two principles;

THE MEASVRES, AND WEIGHTS,

used by the Ancients, may be deduced.

By IOHN GREAVES, *Professor of Astronomy in the Vniversity of Oxford.*

Σπουδαστέον ὅπως ὁρισθῶσι καλῶς αἱ ἀρχαί. μεγάλην γὰρ ἔχουσι ῥοπὴν πρὸς ἐπόμενα.

LONDON,
Printed by *M. F.* for *William Lee*, and are to be sold at his shop at the sign of the Turks head in *Fleet-street*. 1647.

Vna fides, pondus, mensura, moneta sit una,
Et status illæsus totius Orbis erit.

Budelius de monetis.

To his truly noble, & learned friend, *John Selden* Esquire, Burgesse of the University of *Oxford* in the Honourable House of Commons.

SIR,

THat I should present You, who have so honourably deserved of Antiquity, and of Your Country, and, if I may add mine own obligations, in particular of me, with so small a retribution, as a Romane foot, & Denarius, *may seem more proportionable to mine abilities, then to the eminency of Your place, and worth. But You who, to the honour of Your profession, have joined the wisdome of the Ancients, and justly have merited this elogy,*

——Anglorum gloria gentis
Seldenus,

An elogy long since given You by a man, who is deservedly esteemed πολλῶν ἀντάξιος ἄλλων, *the learned* Hugo Grotius, *You are best able to judge of what importance these two are, in the discovery of the weights, and measures, used by the Ancients.*

And first, for measures, the אמה, *or* cubit of the Sanctuary, *in the* Scriptures, Josephus, *and the* Rabbines: *the* Αἰγύπτιος *and* Βαβυλώνιος πῆχυς *in* Herodotus (*the former equall to that of* Samos: *the later mis-rendred by* Pliny, & Solinus, Pes Babylonius): *The* παρασάγγης Περσικὸς *in* Herodotus, *containing* XXX. στάδια, *in* Strabo, *sometimes* LX.

sometimes XL. *and sometimes* XXX. (*but in* Hesychius ὁ παρασάγγης ἔχει μίλια τέτταρα, *and in* Abulfeda *three miles: with whom, and with the* Persians *to this day it is called the* فرسخ farsach): *the* σχοῖνος Αἰγύπτιος *in* Herodotus, Artemidorus, *and* Strabo: *the* πῦς βασιλικὸς, καὶ Φιλεταίρειος *in* Hero: *the* pes Ptolemaicus, *and* Drusianus, *in* Hyginus: *besides infinite others depending upon the proportions of some of these: I say, these cannot after the destruction of those ancient Monarchies, and Republicks, any other way bee restored, then from such monuments, as, by divine providence, have escaped the hands of ruine, and continued to these later ages. For were it not that the* pes Romanus, *or* Monetalis, *as* Hyginus *terms it, were still extant in* Rome, *on the monuments of* Cossutius, *and of* Tit. Statilius Vol. Aper (*for those two columnes, the one with the inscription* ΠΟΔ. Θ. *mentioned by* Marlianus, *and* Philander: *the other with* ΠΟΔ. ΙΒ. *seen by the same Philander, are both lost*) *we might utterly despair of knowing the measures of the* Hebrews, Babylonians, Persians, Ægyptians, Grecians, Romanes, *and of all others, described in Classicall Authors: who could not transmit to posterity the individuall measures themselves, but onely the proportions they respectively had to one another: which proportions being pure habitudes, cannot, as Mathematicians observe, bee reduced to the measures of these times, unlesse, either some of the* ὑποκείμενα *themselves were existent: or else exact copies taken from the Originals were derived to us.*

In like manner it is for weights, the מבה, *the* גבר

واما الفرسخ فهو عند القدما وعند المحدثين ثلثة اميال

The farsach, with the Ancients, and Moderns, contains three miles. Abulf. Geogr. MS.

כסף, *the* שקל, *or* δαρεικὸς *of the* Hebrews, *or* סלעא *of the* Chaldeans, *which* Aruck *renders by foure* זוזים Zuzim, *that is, four* denarii (*from whence, tho* Perſian δαρεικὸς *in* Xenophon, *and* Heſychius, *may have received its denomination*) : *the* τάλαντον Βαβυλάνιον, *containing ſeven thouſand Attick drachmes, the* τάλαντον Αἰγυπτίον *ten thouſand, the* τάλαντον Σύρον *a thouſand five hundred, the* τάλαντον Ἀττικὸν *ſix thouſand, all mentioned by* Julius Pollux ; *the* Talentum Ægyptium *in* Varro, *containing eighty* pondo, *or pounds* ; *the* talentũ Euboicum *in* Feſtus, *four thouſand* denarii : *theſe, with infinite others, both* menſuræ, *and* pondera, *whither conſidered as* Medica, *or* Georgica, *or* Veterinaria, *cannot in our times be reſtored, but onely by ſuch weights of the Antients as are ſtill extant; that is, either by the* denarius *of the Romanes, or* δεκάχαλκον *of the Grecians, or by the* congius *of* Veſpaſian, *or by the* libræ, *and* unciæ Romanæ, *and the like, that have been preſerved by Antiquaries.*

Seeing therefore the denarius *is of as great moment for the diſcovery of weights, as the Romane foot for the knowledge of meaſures, I have taken theſe two, as two irrefragable principles, from whence the reſt uſed by the Ancients may be deduced. And becauſe the* denarius *may be conſidered in a double reſpect, either as* nummus, *or as* pondus : *the firſt acception conducing to the valuation of coins, the ſecond to the certainty of weights : it was therefore neceſſary that both the weight, and valuation of the* denarius, *ſhould be exactly known. To which purpoſe, in* Italy *I examined with a balance (the ſcale of which the eightieth part of a grain would ſenſibly turn) many hundred fair* denarii, *both*

both Consulares, *and* Cæsarei, *as also* quinarii, *or* victoriati *in silver: severall* aurei *of the former, and later Emperours: besides the originall standard of the* congius, *placed by* Vespasian *in the Capitol: and many* unciæ, *and* libræ, *in brasse. From whence I collected the weight of the* denarius Consularis, *and* Cæsareus: *that to be the seventh part of the Romane ounce, as* Celsus, Scribonius Largus, *and* Pliny *rightly describe: and this to be sometimes the eighth part, and sometimes the seventh, but most frequently in a midle proportion betwixt eight, and seven, till* Severus', *and* Gordianus' *times: under whom, and the succeeding Emperours, it recovered the weight of the* denarius Consularis; *but lost much of its finenesse, by the mixture of allay.*

With these denarii, *for the greater certainty, I compared such Grecian coins (especially Athenian) as I had either seen in choice cabinets, or bought of mine own; and those were the* χρυσοῖ, *or* στατῆρες *absolutely taken, which, as* Julius Pollux, *and* Hesychius, *out of* Polemarchus *testifie, weighed two drachmes: the* τετράδραχμα, *or* τετράδραχμα, *or* στατῆρες ἀργυρίου, *four drachmes: the* δραχμαὶ, *the* τρίωβολα, *or as* Pollux *names them, the* ἡμίδραχμα, *with severall others.*

By which comparison I first discovered, that howsoever the Romanes, as Pliny, *and* A. Gellius *expresly;* Valerius, *and* Suetonius, *by way of consequence, equall the* denarius *to the* drachma: *and though the Greeks, as* Strabo, Cleopatra, Plutarch, Galen, Dio, *and many more, equall the* drachma *to the* denarius, *speaking in a popular estimation, and as they vulgarly passed in way of commerce; yet if we shall put on the resolution of him in the Comedy,*

Ocul-

Oculatæ noſtræ ſunt manus, credunt quod vident:

we may evidently diſcern in the ſcale, the drachma Attica *to be heavier then the* denarius. *And therefore all ſuch writers of the Ancients, as equall them, if we ſpeak ſtrictly of weight, and not of eſtimation, have been deceived: and conſequently, all modern writers, following their traditions, in diſcourſes* de ponderibus, & de re nummariâ, *have erred.*

But becauſe it is not probable, that the Ancients, both Greeks, and Romanes, ſhould be deceived in their own coins, and in their own times: it occaſioned me by obſerving the practiſe abroad of the κολλυβισμὸ *in exchanges, with whom the ſame ſpecificall coins, in different States, paſſe with different eſtimations, to think of ſome means how I might reconcile the traditions of the Greeks, and Romanes, concerning the weight, and valuation of the* drachma Attica, *and* denarius; *notwithſtanding the difference in the balance, of ſuch as are now found at* Athens, *and at* Rome.

And this drew from me that diſcourſe, which I have inſerted at the end of this booke, Of ſome directions to be obſerved in comparing the valuations of coins: *which may ſerve, not onely to reconcile the Greek, and Romane writers, but eſpecially, the traditions of* Philo, Joſephus, Epiphanius, *Saint* Hierome, *and* Heſychius: *who make the Hebrew* שקל *ſhekel, equall to the Attick tetradrachme: whereas in the ſcale, which is the beſt judge of this controverſie, I finde them manifeſtly unequall: the Hebrew, or Samaritane ſhekel, being much leſſe then the Attick tetradrachme.*

But it may be questioned, why after the labours of Portius, Budæus, Alciatus, Agricola, Montanus, Mariana, Budelius, Alcasar, Villalpandus, Jo: Scaliger, Capellus, Snellius; *and of many other eminent men, who have writ, either* deditâ operâ, *or* ἐν παρόδῳ, de ponderibus, & mensuris, *I should undertake any thing of this nature. My answer is, that observing in them so great a variety, and contradiction of opinions, I was willing to use mine own judgement, how mean soever, in giving my self private satisfaction. And though I intended this work, as a* πάρεργον *to other imployments; yet having, by the advantage of travailing in forain parts, perused in* Italy, Greece, *and* Ægypt, *more Antiquities, then I think any of them above named single, I thought it would not be unacceptable, if I did, as it is the manner of Travellers, publish at home, such observations, and discoveries, as I made abroad. The which I humbly dedicate to You, as out of a desire to expresse my gratitude for many noble favours: so out of an assurance, that if they receive Your approbation, I need not to fear the censure of others.*

Your most obliged friend,

and humble servant,

John Greaves.

OF THE ROMANE FOOT.

THat the foot was the most received, and usuall measure amongst the Romans, as the cubit amongst the *Jews*, is a thing not controverted by any. For [a] *Polybius* describing their *Scutũ*, makes it *in breadth over the bend two* [Romane] *feet and an half, and in length four feet: or, if it be of a greater sort, a palme more is to be added to this measure.* And not long after expressing the manner of their castrametation, or encamping, he * writes; that *as often as a place is designed for the camp, the Prætorium* (or Generals lodging) *takes up that part, which is fittest for prospect, and direction. Setting therefore up the Standard, where they intend to fix the* Prætoriũ, *they so measure out a square about the Standard, that each side may be distant from it an hundred feet, and the whole area contain foure iugera.* In like manner [b] *Cæsar*, in the description of his bridge over the *Rhine*, makes the binders, or transversary beames, to be *bipedales*. *Tully* also judges the quantity of the apparent diameter of the Sun to be *pedalis*. And not to produce more Authorities, [d] *Suetonius* relates, that *Augustus presented before the people of Rome*

[a] Polyb. li. 6.

* Polyb. *ibid.* τεθείσης δὲ τῆς σημαίας, οὗ μέλλουσι πηγνῦναι τάυτην, ἀπομετρεῖται πέριξ τῆς σημαίας τετρήγωνος τόπος. ὡς τε πάσας τὰς πλευρὰς ἕκατον ἀπέχειν πόδας τῆς σημαίας, &c.

[b] Cæs: Comm. lib. 4.

[c] Cicero l. 2. Academ. quæst.

[d] Suetonius in Augusto.

Adolescentulũ Lucium honestè natum exhibuit, tantùm ut ostenderet, quòd erat bipedali minor, librarum XVII. ac vocis immensæ.

Lucius *a young Gentleman, well descended, onely for to shew that he was lesse then two feet in height, seventeen pounds in weight, and of an immense voice.* But concerning the precise quantity of this foot, there is not any one thing after which learned men have more inquired, or in which they doe lesse agree. For *Budeus* equals it to the *Paris* foot; *Latinus Latinius*, *Maffæus*, *Vrsinus*, and others, deduce it from an ancient monument in the Vatican of *T. Statilius Vol. Aper*: *Portius Vicentinus*, *Philander*, *Georgius Agricola*, *Ghetaldus*, *Donatus*, and severall others, contend the foot on *Cestius* monument in *Rome*, to be the true Romane foot: *Marlianus* describes it out of a Porphyry columne, with this inscription ΠΟΔ. Θ: *Lucas Patus* defines it from some brasse feet found amongst the *rudera* in *Rome*: *Villalpandus* derives it from the measure of the Congius, placed by *Vespasian* in the Capitol (the originall Standard being still extant): *Willebrordus Snellius* equals it to the *pes Rhinlandicus*: and severall others have had severall fancies, and conjectures. In such a variety, and incertainty of opinions, we have no more solid foundation of our inquiry, then either to have recourse to the writings of the Ancients; or else to such other monuments of Antiquity, as having escaped the injury, and calamity of time, have continued intire to this present age.

[c] Vitruvius l. 3.

And first for the Ancients. [c] *Vitruvius* in his third book of Architecture, gives this description of the Romane foot: *E cubito cùm dempti sunt palmi duo, relinquitur pes quatuor palmorum. Palmus autem habet quatuor digitos, ita efficitur*

pes

uti pes habeat XVI. *digitos, & totidem asses æreos denarius.* [f] *Columella* shews that it was the basis, and foundation to all their other measures: *Modus omnis area pedali mensurâ comprehenditur, qui digitorum est* XVI. *Pes multiplicatus in passus, & actus, & climata, & jugera, & stadia, centuriasque, mox etiam in majora spatia procedit. Passus pedes habet* V. [g] *Frontinus* more clearly, and distinctly expresseth the severall parts, and divisions of it. *Pes habet palmos* IV. *uncias* XII. *digitos* XVI. *Palmus habet digitos* IV. *uncias* III. *Sextans, qua eadem dodrans appellatur, habet palmos* III. *uncias* IX. *digitos* XII. From which Authority of *Frontinus*, and the place before cited of *Vitruvius*, we may collect some analogy to have been observed in the proportions of the Romane foot, and of the Romane coins. For as the *denarius* contained XVI. *asses*, so the foot contained XVI. *digitos*: And as the *assis* was divided in XII. *uncias*, so likewise the foot was divided in XII. *uncias*; and therefore the *dodrans* is used by *Frontinus*, and the *semuncia*, and *sicilicus* by *Pliny*, for proportionable parts of the Romane foot; as the same are used by other Classicall Authors for proportionable parts of the Romane *assis*, and *uncia*. From which analogy, the *pes Romanus*, I suppose is tearmed by * *Hyginus pes monetalis*. Likewise in the ancient Laws of the XII. Tables (which *Tully* cals the fountains of the Civill Law) the *sestertius pes* hath the same proportion with the *sestertius in coines*; For as the *sestertius* according to *Arruntius*, was *olim dupondius & semis*, anciently two pounds of brasse and an half;

[f] *Columella l. 5. de R. Rust.*

[g] *Frontin. de limitibus agrorum.*

* *Hygin. de limit. constit.*

* *Arruntius* 8 *editione Gotofredi.*

so the *seſtertius pes* was two feet and an halfe. * *Voluſius Matianus*, « *Seſtertius duos aſſes &* « *ſemiſſem, quaſi ſemis tertius; Graca figura* « *ἓβδομον ἡμιτάλαντον. Nam ſex talenta & ſe-* « *mitalentum eo verbo ſignificantur. Lex eti-* « *am* XII. *Tabularum argumento eſt, in qua duo* « *pedes & ſemiſſis, ſeſtertius pes vocatur.* But to return to *Frontinus*, who farther diſcourſing of the Romane foot, gives a diſtinction of three ſorts of feet: and thoſe were firſt, *pes porrectus*, next, *pes conſtratus*, or as [h] *Agricola* reades it, *contractus*, and laſtly, *pes quadratus*. The firſt was the meaſure of longitudes, the other two of ſuperficies. There were, writes * *Frontinus*, *In pede porrecto ſemipedes duo, in pede conſtrato ſemipedes quatuor, in pede quadrato ſemipedes octo.* Which words of his are to be thus explicated; the *pes porrectus*, was the Romane foot extended in length, and therefore there were in it *ſemipedes duo*: The *pes conſtratus*, was the ſquare of the *ſemipes*, and therefore the perimeter of it contained *ſemipedes quatuor*, or, which is all one, two intire Romane feet: The *pes quadratus*, was the ſquare of the Romane foot; wherefore of neceſſity there muſt bee foure feet in the perimeter, or in *Frontinus'* expreſſion, eight *ſemipedes*. The ſame [i] Author likewiſe in his book *de aquæductibus*, deſcribing the digit, & *uncia* of this, (*Eſt autem digitus*, (ſaies he) *ut convenit, ſexta decima pars pedis, uncia duodecima*) uſeth a diſtinction of digits, as hee did of feet before, not mentioned by any other Author: *Quemadmodum autem inter unciam, & digitum*

* *Vol. Mat: de aſſis diſtrib.*

[h] *Agricola de menſuris quibus intervalla metimur.*

* *Frontinus de limitibus agrorum.*

[i] *Frontinus de aquæductibus.*

gitum diverſitas, ita & ipſius digiti ſimplex obſervatio non eſt. nam alius vocatur quadratus, alius rotundus. Quadratus tribus quartis decimis ſuis rotundo major: rotundus tribus undecimis ſuis quadrato minor eſt. The proportions here aſſigned by him to the *digitus quadratus*, and *rotundus*, are the ſame, which [1] *Archimedes* long before uſed: and thoſe are, that a circle hath the ſame proportion to the ſquare of the diameter, that XI. hath to XIV. *Hero* alſo, diſcourſing of ſeverall ſorts of meaſures, informes us thus concerning the foot: Ὁ μὲν δάκτυλος, μέτρον ἐστὶ σμικρότατον. ἡ δὲ δοχμὴ ἔστι δακτύλων δ', ὅπερ μέτρον καὶ δακτυλοδόχμη πολαιστὴ καὶ δῶρον καλεῖται. ἡ δὲ λιχὰς ὅτι δακτύλων ι', τὸ δὲ ὀρθόδωρον ια', ἡ δὲ σπιθαμὴ ιβ', ὁ δὲ πῆχυς δόχμων δ', ἤτοι δακτύλων ις', ἡ δὲ πυγμὴ δακτύλων ιη', ὁ δὲ πυγὼν κ', ὁ δὲ πῆχυς κδ', ἤτοι δοχμῶν ς', ἡ δὲ ὀργυιὰ πήχεων δ', ἤτοι ποδῶν ς', *the digit is the leaſt meaſure, the palm conſiſts of* IV. *digits, and is called dactylodochme, and palaiſte, and doron. The lichas is tenne digits, the orthodoron eleven: The ſpan* XII. *The foot hath* IV. *palmes, or* XVI. *digits the pygme* XVIII. *digits. The pygon* XX. *The cubit* XXIV. *or* VI. *palms the orgyia* IV. *cubits, or* VI. *feet.* Moſt of which meaſures the Romanes borrowed from the Greeks; as on the contrary the Greeks borrowed the λίχεον, and μίλιον, from the Romane *jugerum*, and *milliare*. The ſame *Hero* deſcribes another ſort of foot uſed in *Italy*. Ὁ δὲ Ἰταλικὸς ποῦς δακτύλους ἔχει τρεῖς καὶ δίεκα καὶ τρίτον. *The Italian foot contains thirteen digits, and one third*, Whence [m] *Salmaſius* concludes, that the Romanes uſed

[1] *Archim. de circ: dimenſ. prop. 2.*

[m] *Salmaſii Exercit: Plinianæ. p. 4.*

one ſort of foot in *Rome*, conſiſting of XVI. *digits*, and in ſome parts of *Italy* another being but XIII. digits, and one third. Which might be granted, did not [n] *Hyginus*, who is much ancienter, in his tract *de limitibus conſtituendis*, contradict it. His words are theſe: *Item dicitur in Germaniâ in Tungris pes Druſianus, qui habet monetalem, & ſeſcunciam, ita ut ubicunque extra fines, legéſque Romanorum, id eſt, ut ſolicitiùs proferam, ubicunque extra Italiam aliquid agitatur inquirendum; & de hâc ipſâ conditione diligenter præmoneo, ne quid ſit, quod præteriiſſe videamur.* [o] Where ſpeaking immediately before of the *pes Romanus*, or as he alſo cals it, the *pes monetalis*, by which hee meaſures and defines the *limites*, he gives us this caution, that out of *Italy* (for in *Italy* he ſuppoſes one meaſure to be generally received) we are to obſerve the quantity of the foot, or meaſure of the Country. And for this reaſon, to avoid ambiguity, he aſſigns the proportions of the *pes Druſianus*, at *Tongeren* in *Germany*, to be a *ſeſcuncia* more then the *pes monetalis* uſed at *Rome*, and in *Italy*. And ſo in another part about *Cyrene*, which *Ptolemy* gave to the Romanes. [p] *Pes eorum qui Ptolemaicus appellatur habet monetalem pedem, & ſemunciam.* But to omit the *pes Ptolemaicus* (For our inquiry is onely of the Romane foot.) I cannot but wonder at the miſtake of [q] *Joſeph Scaliger*, concerning the *pes Druſianus*, and *Romanus*, who thus writes. *Pes igitur ille Druſianus major eſt Romano ſeſcunciâ. fuit enim* XXII. *digitorum, quantorum* XVI. *eſt pes Romanus.* If it were but a

[n] *Hyginus de limit. conſtit.*

[o] *Hyginus ibid.*

[q] *Joſ. Scaliger de re nummariâ.*

ſeſcun-

ſeſcuncia, greater then the Romane foot, as *Hyginus*, and he alſo make it, how can it poſſibly be XXII. *digitorum*? or how can he excuſe his words, which immediately follow? *Ex quo colligimus pedem Druſianum omnino eſſe eum, qui hodie in Galliâ, & Belgio in uſu eſt, qui profectò major eſt* VI. *digitis, quantorum* XVI. *eſt pes, qui Romæ in hortis Angeli Colotii ſculptus in ſaxo viſitur. Eum enim nos cum pede Gallicano comparantes, id veriſſimum eſſe deprehendimus.* Neither is the errour of ſome others much leſſe, in making the *pes monetalis*, or *Romanus*, and *pes Regius Philetærius*, to be equall. Becauſe the Romane foot conſiſted of XVI. digits, as *Frontinus* writes, and the *pes Philetærius* of as many, as [p] *Hero* ſhews: ὁ ποῦς ὁ μὲ βασιλικὸς, ᾧ φιλεταίρι- & λεγόμενος ἔχει παλαιστὰς δ', δακτύλους ις'. therefore both theſe are equall. The errour is in ſuppoſing all digits to be alike; and therefore the ſame number of digits being in both, that both are equall. By the ſame argument we may conclude the Romane foot, and Arabian foot, and the derah, or cubit of theſe, to be equall to the cubit, or *ſeſquipes* of the Romanes: ſeeing [q] *Abulfeda*, an Arabian Geographer, defines the derah to conſiſt of XXIV. digits, and ſo many alſo did the Romane *ſeſquipes* contain. But the obſervation of [r] *Rhemnius Fannius* in this particular is much better; which he applies to weights, and we may by analogy aſſign to meaſures.

[p] *Heronis Iſagoge.*

[q] *Abulfedæ Geogr. Arab. MS.*

[r] *Rhemnii Fannii fragmentū.*

Semina ſex alii ſiliquis latitantia curvis
Attribuunt ſcripulo, lentes veraciter octo,
Aut totidem ſpeltas, numerant, triſtéſve lupinos
Bis duo; ſed ſi par generatim his pondus ineſſet,

Servarent eadem diverſa pondera gentes:
Nunc variant. Etenim cuncta non fœdere certo
Natura, ſed lege valent, hominúmque repertis.

But to return to the Romane foot. Laſtly, we may alleage [t] *Iſidorus Hiſpalenſis. Palmus autem, quatuor habet digitos, pes* XVI. *digitos, Paſſus pedes quinque, Pertica paſſus duos, id eſt decem pedes.* And this is that which I finde delivered by ſuch of the Ancients, as are extant. Out of which bare, and naked deſcriptions, it is as impoſſible to recover the Romane foot, as it is for Mathematicians, to take either the diſtance, or altitude of places, by the proportions of triangles alone, or by Tables of Sines, and Tangents, without having ſome certain and poſitive meaſure given, which muſt be the foundation of their inquiry. All that can be collected by theſe deſcriptions, is this, that wee may know into how many parts the Romanes uſually divided their feet; and all theſe diviſions I have ſeen in ſome ancient ones. But ſuppoſe there were no Romane foot extant; how by XVI. digits, or by IV. palms, or by XII. *uncia*, (which is the moſt uncertain of all; ſeeing whatſoever hath quantity, how great or ſmall ſoever it is, may be divided in XII. *uncias*) could it be preciſely reſtored? For if that of * *Protagoras* be true, as well in meaſures, as in intellectuall notions, that man is πάντων χρημάτων μέτρον: Whence [u] *Vitruvius* obſerves, that the Latines denominated moſt of their meaſures, as *their digit, palm, foot, and cubit*, from the parts and members of a man: who ſhall bee that perfect and ſquare man, from whom we may take a pattern of theſe meaſures?

[t] *Iſid. Hiſpal. l.15.c.15.*

[*] *Protagoras apud Ariſtot. l. 12. cap. 5. Metaphyſ.* πάντων εἶναι χρημάτων μέτρον ἄνθρωπον.

[u] *Nec minus mēſurarum rationes, quæ in omnibus videntur neceſſariæ eſſe, ex corporis membris collegerunt: uti digitum, palmum, pedem, cubitum. Vitruv. l 3 c.1.*

or

or if there be any ſuch, how ſhall we know him? or how ſhall we be certain the Ancients ever made choice of any ſuch? Unleſſe, as ſome fancy, that the cubit of the Sanctuary, was taken from the cubit of *Adam*, he being created in an excellent ſtate of perfection: So we ſhall imagine theſe digits, and palms, to have been taken from ſome particular man of completer lineaments then others. On the other ſide, if this foot may be reſtored by the digits, and palms of any man at pleaſure, ſince there is ſuch a difference in the proportions of men, that it is as difficult to finde two of the ſame dimenſions, as two that have the ſame likeneſſe of faces, how will it be poſſible, out of ſuch a diverſity, to produce a certain and poſitive meaſure, conſiſting in an indiviſibility, not as a point doth in reſpect of parts, but in an indiviſibility of application, as all originals, and ſtandards ſhould doe? The *Arabians*, to avoid this difficulty, ſhew us a more certain way, as they ſuppoſe, how to make this commenſurall digit, and conſequently the foot: and that is by the breadth of ſixe barly corns laid one contiguous to another. For thus [x] *Muhammed Ibn Meſoud* in his book, intituled in Perſian *gehandaniſh*, relates; that *in the time of Almamon* (the learned Calife of *Babylon*) *by the elevation of the pole of the aequator, they meaſured the quantity of a degree upon the globe of the earth, and found it to be fifty ſix miles, and two thirds of a mile: every mile containing four thouſand cubits, and each cubit twenty four digits, and every digit ſix barly corns.* The ſame proportions are aſſigned in the *Geographia*

[x] محمد ابن مسعود MS.

phia Nubiensis, printed in Arabick at *Rome*: الذراع اربعة وعشرون اصبعا والاصبع ست حبات شعير *The cubit is twenty four digits, and every digit is six barly corns.* But this is as uncertain as the former, and is built upon a supposition, that all such are of the same dimension. Whereas those of one Country differ much from those of another; and those of the same Country (as I have made triall in *Ægypt*, more out of curiosity, then as hoping this way to give my self satisfaction) are not all of the same bigness: and not onely so, but in the self same ear, there is a sensible difference, as experience doth shew. And yet *Snellius*, a man much to be commended for his abilities in the Mathematicks, and to be blamed for his supine negligence, both in his measure of the magnitude of the earth, and in his dimensions of the Romane foot, upon these sleight & weak principles, deduces the Arabian foot, [a] *this containing ninety six grains, such as his Roman foot* (for none besides himself will own it) *contains ninety.* Wherefore some other Arabians to mend the matter, limit the breadth of one of them, [b] *by six hairs of a camel, evenly joyned one by another*: by which invention their derah being almost answerable the most exact of any in the East) limits their breadth by VI hairs of an horse.

[a] *Snellius in Eratosth. Batav. lib. 2. cap. 2.*

[b] *Aly Kushgy*, who assisted *Ulug Beg* in compiling his Astronomicall Tables in Persian (Tables

هر اصبع مقدار شش جو معتدل وعرض هر جو مقدار شش تاره موي بال اسب *Every digit is six barly corns laid evenly together, and the breadth of every barly corn is six haires of an horses taile.* Instit. Astron; Aly Cushgy. MS.

ſwerable to the Romane *ſeſquipes*, or cubit, ſhall conſiſt of twenty four digits, and every digit of ſixe barly corns, and every barly corn of ſix hairs of a camell. So that in concluſion the hair of a camell, ſhall be the *minimum* in reſpect of meaſures. But this invention however at the firſt it may ſeem ſomewhat ſubtile (for we are come now almoſt as low as atomes) is leaſt of all to be approved. For though the ſuppoſition were true that all hairs are of a like bigneſſe in all camels, whereas they are different in one and the ſame; yet this objection is unanſwerable, that ſeeing hairs are not perfectly round, though the the ſenſe judges them ſo, but angular, and that with ſome inequality, as magnifying glaſſes plainly demonſtrate, it will be very difficult ſo to ſize them together, that they ſhall always take up the ſame breadth: and if they do not, little errors committed in ſuch ſmall bodies, though at the firſt inſenſible, will infinitely increaſe, and multiply, in the meaſuring of great diſtances, to which theſe are ſuppoſed the foundation. And therefore I cannot but approve the counſell of [b] *Villalpandus*, who adviſeth ſuch as will examine meaſures and weights, to begin with the greater, and not with the leſſer. And that there is reaſon for his aſſertion, may be made evident, eſpecially in weights, to ſuch as ſhall make an experiment. For admit there were a Standard of ten thouſand grains, and another of one grain, it will be eaſie, by a continued ſubdiviſion of the former, with a good balance, to produce a weight equall to the ſtandard of one grain: yea, though at the beginning,

[b] *Villalpandus de apparatu Urbis ac Templi par. 2. l. 3. c. 25. Atque in univerſum illud unum monitos velim eos omnes, qui menſurarum ac ponderum cognoſcendorum deſiderio tenẽtur, ne à minimis incipiant examinare majora: nam vel minimus quiſque error ſæpius multiplicatus in magnum adducit errorum cumulum.*

ning, ſome little errour had been committed, which after many diviſions will vaniſh, and become imperceptible. Whereas on the contrary, the moſt curious man alive, with the exacteſt ſcale that the induſtry of the moſt skilfull artizan can invent, ſhall never be able out of the ſtandard of one grain, to produce a weight equall to the weight of ten thouſand grains, but that there ſhall be a ſenſible, and apparent difference; yea, though he had that excellent ſcale mentioned by [c] *Capellus* at *Sedan*, which would ſenſibly be turned with the IV. hundreth part of a grain. The like difference as we find in weights, we may conceive by analogy to be in meaſures, when they ſhall be made out of ſuch litle parts, as hairs, barly corns, digits, and the like. And therefore I cannot but diſapprove the ordinary courſe of moſt Geographers, whither Greeks, Latines, or Arabians, that from ſuch nice beginnings, meaſure out a degree upon earth, and conſequently the magnitude of this globe. On the contrary the enterpriſe of [d] *Snellius* in his *Eratoſthenes Batavus*, and of our Countryman [e] *M. Wright*, hath been more commendable: who by the ſpace of a degree on earth, (or which were better of many degrees) have endeavoured to fixe meaſures, with more exactneſſe, and certainty for poſterity. But of this argument I ſhall have occaſion to ſpeak hereafter. And therefore to return to the buſineſſe in hand.

[c] *Capellus de pond. & nummis lib. 1.*

[d] *Snell: in Eratoſth: Bat. lib. 2.*
[e] *Wright*, of the errours of Navigation.

Since the Romane foot cannot be recovered by hairs, grains, digits, palms, and ſuch like phyſicall bodies, which being of a various, and indeterminate magnitude, cannot give, unleſſe by ac-

accident, the commenſuration of that which ought to be preciſely limited, and determined: ſome relinquiſhing the former way as erroneous, have endeavoured, with much ingeniouſneſs, by weights, to find out the Roman foot. For there is the ſame analogy between meaſures and weights, as between continued, and diſcrete quantities: And as Mathematicians by numbers demonſtrate, or rather illuſtrate the affections of lines, ſuperficies, and Geometricall bodies: ſo by weights, meaſuring ſome phyſicall bodies, eſpecially ſuch as are liquid, in cubicall veſſels, (which are eaſieſt commenſurable) we may render the exact quantity of the Romane foot, and by conſequence of all their other meaſures. And therefore [f] *Lucas Pætus*, and [g] *Villalpandus*, have attempted with probable reaſons to diſcover the Romane foot, the one by the *Sextarius*, the other by the Romane *Congius*. For the *Sextarius* being the ſixth part of the *Congius*, and the *Congius* containing X. *libræ*, or pounds, as it is manifeſt by that exquiſite ſtandard in *Rome*, with this inſcription.

[f] *Luc. Pætus li. 3. de menſur. & pond: Rom.*
[g] *Villalpandus de appar. Vrbis ac Templi. par: 2. l. 3. cap. 25.*

IMP. CÆSARE
VESPAS. VI
COS
T. CÆS. AUG. F. IIII
MENSURÆ
EXACTÆ IN
CAPITOLIO

P X

P X ſignifies *Pondo decem.*

Again the *Congius* being the eighth part of the *amphora*, or *quadrantal*, filled with water or wine, as by the teſtimonies of [h] *Dioſcorides*, [i] *Sex: Pompeius*, and of an ancient Anonymus Greek Authour tranſlated by *Alciat*, it doth appear: if therefore a Veſſell be made of a cubicall figure, which may receive VIII. *congii*, or XLVIII. *ſextarii*, or LXXX pounds of water or of wine, out of the ſides of this cube, by [k] *Rhemnius Fannius* his deſcription, or rather by *Sextus Pompeius*, who is ancienter, will the Romane foot be deduced. For both theſe write (neither is it as yet contradicted by any man) that the longitude of one of the ſides of the *amphora* (being a cube) is anſwerable to the Romane foot. And here our inquiry would be at an end (ſuppoſing the Authorities of *Feſtus*, and *Fannius* to be unqueſtionable) were there not farther ſome objections, which cannot eaſily bee removed. And thoſe are firſt, a ſuppoſition that we have the true Roman *libra* (for by this we are to finde the *Congius*, admitting there were none extant, as by the *Congius*, the *amphora*, or *quadrantal*): a thing of as great difficulty as the foot it ſelf. And beſides, if this were obtained, yet we cannot have an abſolute certainty, that water, or wine, ſhall in all places alike ponderate; by reaſon of the different gravity, which is obſerved in naturall bodies, though they be homogeneous, and of a like ſubſtance. Wherefore laying aſide all ſuch ſpeculations, as being farre from that accurateneſſe, which is required, there is no other poſſible means left for this diſcovery, but to have recourſe to ſuch monuments of Antiquity,

[h] *Fragmenta Dioſcoridis.*
[i] *Sext. Pomp: Feſtus de Verb: ſignif.*
[k] *Rhem: Fann: fragment.*

tiquity, as have escaped the injury, and calamity of time, which is our next, and second inquiry.

And here it will not be amisse to see what learned men, who not long preceded our age, have observed out of ancient monuments, concerning the Romane foot: and then to relate what course I took to give my self private satisfaction, which, I hope, will be also satisfactory to others. *Philander* in his Commentaries upon *Vitruvius*, being one of the first that had seen, and diligently perused many ancient measures in *Rome* (whereas *Portius*, *Agricola*, *Glareanus*, and some others, received them upon trust) gives us so much the more certain information. His words are these: [1] *Veruntamen quoniam non statim ex cujuscunque pollicibus, aut digitis, quis fuerit apud antiquos Romanus pes sciri potest, facturum me studiosis rem gratam putavi, si ad marginem libri semipedem apponerem, dimensum ex antiquo pede, in marmore, quod est in hortis Angeli Colotii Romæ sculpto, cujus etiam, nisi me fallit memoria, meminit Leonardus Porcius lib. de Sestertio. Eum enim pedem, nos cæteris qui circumferuntur, prætulimus, quòd conveniret cum eo, quem sculptum invenimus in alio marmoreo epitaphio T. Statilii Vol. Apri mensoris ædificiorum, quod operâ Jacobi Meleghini summi Pont: Architecti ex Janiculo non ita pridem refossum, in Vaticanum hortum translatum est. Quamvis jacentem in Basilicâ Apostolorum columnam ex porphyrite, cum his Græcis in calce literis* ΠΟΔ. Θ. *id est pedum novem, nos cum dimensi essemus, deprehenderimus non respondere nostro eum, quo nsus*

[1] *Philander in l. 3. cap. 3. Vitruvii.*

usus fuerat ejus columnæ artifex, sed nostro esse majorem duobus scrupulis & besse, id est unciæ parte nonâ. Vt argumentum aliquod esse possit pedis Græci fuisse modulo scapum columnæ factum; quod facilius conjicere potuissem, si integra esset alia ex eodem lapide columna, quam in viâ latâ est conspicere jacentem, his in calce literis ΠΟΔ ΙΒ *insignitam. Verùm quando studium Herodoto l. 2. Heroni, Suidæ, cæteris Græcis sit sexcentorum pedum; Plinio, Columellæ, cæteris Latinis sexcentorum viginti quinque nostrorum, necesse est Romanum à Græco semunciâ superari.* Thus far *Philander*. Not long after him *Lucas Patus*, having examined the foot on *T. Statilius* tombe, and that other of *Cossutius*, together with several ancient ones in brasse, found amongst the *rudera* at *Rome*, concludes: that the [m] true Romane foot *dictis duobus marmoreis comparatus, septimâ unciæ parte, sive unciæ scripulis tribus, & duabus scripuli sextulis, & sextulæ semisse brevior est.* Much about the same time I finde in *Ciaconius* out of *Latinus Latinius*, another experiment to have been made, by many eminent men together at *Rome*. *Superioribus autem annis* (saith [n] he) *Ant: Augustinus, qui postmodum fuit Archiepiscopus Tarraconenſis, Io: Baptista Sighicellus Episcopus Faventinus, P. Octavius Pacatus, Achilles Maffæus, Achilles Statius, Benedictus Ægius, Fulvius Vrsinus, Latinus Latinius, cùm veram pedis Rom. quantitatem statuere vellent, plures ejusd. pedis mensuras simul contulerunt, & earum octo cum antiquissimâ dicti pedis formâ, quæ in basi quâdam in hortis Vaticanis extat, adamussim convenire videntes, ex hoc*

[m] *Luc. Patus l. 1. de antiq. Rõ. & Græc. intervall. mensuris.*

[n] *Ciaconius è Lat. Latinii observationibus de pede Rom.*

hôc pede quadrato vas confecerunt, quod etiam nunc octoginta aquæ, vel vini libras, quibus publicè signatis civitas utitur, omnino capere invenerunt, & cum octo congiis antiquis ita congruere, ut neque minus quidquam, neque amplius inter utraque esset. Quo experimento evidentissimè cognoverunt, & libras nostri temporis cum antiquis Romanis esse easdem, cùm congii antiqui vas sub Vespasiano Imp: signatum decem libras contineret, quot etiam nostri temporis libras capit; & hunc esse justum pedem Romanum, cùm ex ejus modulo perfectum Quadrantal octoginta libras contineat, quæ cum congii antiqui libris ad momentum respondent. Notwithstanding these observations, *Villalpandus*, knowing how necessary it was to have the true dimensions of the Romane foot, to find out the proportions of the Hebrew cubit, made new experiments: and after examination of the measures, and weights at *Rome*, he thus concludes. ° *Sed iis omnibus tam variis, aliisque multis sententiis prætermissis, in hâc unâ conquiescimus, ut arbitremur ubinum Farnesianum Congium posse omnes antiquas Romanorum, atque aliarum gentium mensuras, omniáque pondera pristinæ integritati restituere.* And in another place. *Quapropter aliis omnibus conjecturis, argumentationibus, areis pedibus, marmoreis dimensionibus, aut sculpturis, quasi maris fluctibus prætermissis, in hâc unâ pedis longitudine, quasi in portu conquiescere jam tandem decrevimus.* Yet *Snellius* in his *Eratosthenes Batavus*, could not rest satisfied with this foot of *Villalpandus*, how exquisite soever he imagines it. For he had a minde to discover it neerer home:

° *Villalpandi apparatus Urbis & Templi. par. 2. l. 3. c. 15.*

making the Rhinland foot equal to the Romane. The proof of his assertion is taken from an ancient Romane *armamentarium*, or Fort, neer the sea, not far from *Leiden*, which by the Natives is called *het huys te Briten*: And is supposed by *Ortelius* to have been built by *Claudius Caesar*, in his intended voiage for *Britanne*, of which * *Suetonius*, and *Dio*, make mention: *sive in commodiorem legionum, cohortiumque transvectionem, sive quo milites hibernarent* (saith Ortelius). *Arcis ipsius fundamenta*, (according to ¶ *Snellius*) *quadratâ sunt formâ, & quaquaversum ducentis quadraginta Rhinlandicis pedibus patent. Vt vel hinc Romanae mensurae vestigia quàm planissimè agnoscas. Nam ipsius podismus duorum Romanorum jugerum magnitudinem complectitur. Jugeri enim mensuram ducentos & quadraginta longitudinis pedes esse, non est ferè quisquam qui ignoret, inquit Quintilianus l. 1. cap. 10. Varro de re rustica libro 1. cap. 10. Jugerum quod quadratos duos actus habet. Actus quadratus, qui & latus est pedes 120. & longus totidem. Is modius, ac mina Latina appellatur. ut mihi planè dubium non videatur, eos hic Romanae mensurae modum secutos, hujus structurae podismum ita comprehendisse secundum jugeri mensuram, ut duo jugera, vel actus quatuor contineret. Frontinus de limitibus. Hi duo fundi juncti jugerum definiunt, deinde haec duo jugera juncta in unum quadratum agrum efficiunt, quòd sint omnes actus bini: ut singula ideò latera ducentos & quadraginta pedes in longum patère necesse sit. Atqui totidem pedibus Rhinlandicis singula latera exporrigi Geodaetarum experientia confirmat. Vnde efficitur Romanum anti-*

* *Suetonius in Claudio Dio hist. Rom. lib. 60.*

¶ *Snell. in Eratosth. Bat. l. 2. cap. 2.*

antiquum pedẽ noſtro Rhinlandico planè æquari.

After theſe experiments of ſo many able, and learned men, and thoſe too taken from ancient Monuments, it may ſeem ſtrange, that we ſhould not be able as yet to define the true quantity of the Romane foot. For this I can aſſigne no other reaſons then theſe. Firſt, that thoſe which have deſcribed it, have either not exactly, and with ſuch diligence, as was requiſite, performed it; or elſe, if they have been circumſpect in this kind, they have omitted to compare it with the Standards for meaſures of other Nations. On the contrary, thoſe which have compared it with the preſent Standards, never took it from the ancient Monuments, and Originals, which are at *Rome*, but onely from ſome draughts, or ſchemes, delineated in books. Now how uncertain a way this is, doth appear by [r] *Villalpandus*, who thus writes. *Ego dum hæc ſcriberem, hunc Colotianum pedem circino expendi, & in annotationibus Guil: Philandri ſolertiſſimi viri, & apud Georgium Agricolam, & apud Lucam Petum, & Staniſlaum Grſepſium, & nullum potui reperire alteri æqualem, imo verò neque ejuſdem pedis aſſignatas ſimiles partes.* The ſame have I obſerved in thoſe Romane feet deſcribed by *Portius*, *Agricola*, *Philander*, *Patus*, *Giaconius*, and *Villalpandus* himſelf, that they differ one from another: and not onely ſo, but thoſe of the ſame Authour, in the ſame impreſſion, are likewiſe different. Which laſt muſt ariſe, either by the diverſe extention of the paper in the preſſe, when it is moiſt, or by the inequall contraction of it, when it grows dry, or by ſome

[r] *Villalpand. de apparatu Vrbis ac Templi par. 2. l. 3. c. 25.*

other accident, in the beating, and binding. So that though it were granted, that so many learned men had found out, what we inquire after, the Romane foot; yet it is impossible out of those schemes, and draughts, delivered in their books, for the reasons before specified, to attain an absolute certainty. But [f] *Snellius* shews us a remedy of this difficulty, which in my opinion is as vain as his Romane foot, (seeing by his supposition all paper must shrink alike, be it thick or thinne) and that is, to allow one part in sixty for the shrinking of the paper. *For so much*, saith he, *doe Typographers observe, that letters contract themselves, when they are taken off wet from the types.*

[f] *Pars sexagesima typorum & formarum longitudini excusis decedit, quemadmodū à diligentibus & peritis typographis sciscitando edoctus sum. Snell. in Eratosth. Batav. l. 2. cap. 1.*

Wherefore having received small satisfaction from the writings of the Ancients, and not much better from the imperfect designations of the Romane foot by modern Authors, I proposed to my self in my travails abroad, these waies, which no reasonable man but must approve of. And those were first, to examine as many ancient measures, and monuments, in *Italy*, and other parts, as it was possible. And secondly, to compare these with as many Standards, and Originals, as I could procure the sight of. And last of all, to transmit both these, and them, to posterity, I exactly measured some of the most lasting monuments of the Ancients. To this purpose, in the year 1639 I went into *Italy*, to view, as the other Antiquities of the Romanes, so especially those of weights, and measures; and to take them with as much exactnesse, as it was possible, I carried instruments with me made by the best Artizans,

Where

Where my firſt inquiry was after that monumẽt of *T. Statilius Vol. Aper*, in the Vatican gardens, from whence [t] *Philander* took the dimenſions of the Romane foot, as others have ſince borrowed it from him. In the copying out of this upon an Engliſh foot in braſſe, divided into 2000 parts, I ſpent at the leaſt two houres (which I mention to ſhew with what diligence I proceeded in this, and the reſt) ſo often comparing the ſeverall diviſions, and digits of it reſpectively one with another, that I think more circumſpection could not have been uſed; by which I plainly diſcovered the rudeneſſe, and inſufficiency of that foot. For beſides that the length of it is ſomewhat too much, (whatſoever [u] *Latinius* out of an obſervation made by *Ant. Auguſtinus, Sighicellus, Pacatus, Maffæus, Statius, Ægius*, and *Fulvius Vrſinus*, pretends to the contrary) there is never a digit, that is preciſely anſwerable to one another. Howſoever it contains 1944. ſuch parts, as the Engliſh foot contains 2000.

[t] *Philander in l. 3 c. 3. Vitruvii.*

[u] *Ciaconius è Latino Latinio.*

My next ſearch was for the foot on the monument of *Coſſutius, in hortis Colotianis*, frõ whence it hath ſince received its denomination (though it be now removed) being termed by Writers *pes Colotianus*. This foot I took with great care, as it did well deſerve, being very fair, and perfect: afterwards collating it with that Romane foot, which *Lucas Petus* cauſed to be ingraven in the *Capitol*, in a white marble ſtone, I found them exactly to agree; and therefore I did wonder, why he ſhould condemne this with his pen (for he makes ſome

[a] *Luc Pætus l.1 de antiq Rom. & Græc. intervall mensurat.*

objections against it) which notwithstanding he hath erected with his hands (as appears by the inscription in the Capitol, CURANTE LUCA PAETO). It may be upó second thoughts, he afterward privately retracted his error, which he was not willing to publish to the world. Now this of *Cossutius* is 1934. such parts, as the English foot contains 2000.

[b] *Marlianus de antiquit. Urbis.* [c] *Philander in lib. 3. c. 3. Vitruvii.*

Next I sought after that Porphyry Columne mentioned by [b] *Marlianus*, as also by [c] *Philander*, and others, with this inscription ΠΟΔ. Θ. For if the length of that Columne were assigned according to the proportion of the Greek foot, then would the Romane foot be thence deduced: this (as I shall elsewhere shew) containing 24. such parts, as that contained 25. Or if it were made according to the Romane foot, as the Grecians after their subjection to the Romane Empire, often used the same measures that the Romanes did, then had I my desire. But the Columne being defaced, or lost, my labour was in vain: And it seems [a] *Pætus* about LXX. years before, made the same inquiry, with as little satisfaction.

[a] *Luc Pætus l.1 de antiq Rom. & Græc. intervall. mensurat.*

I should be too tedious in describing the severall feet, which I have perused in brasse, found amongst the *rudera* at *Rome*, and carefully preserved by Antiquaries: of most of which *Peireskius* hath given a good character, in some letters of his, which I have seen in the hands of *Buchardus*, a learned man, not yet printed. [d] Who thus writes: *I cannot sufficiently wonder at the inequality which I have found in the divisions by digits, and inches, of the ancient*

[d] *Ex Epistolis Peireskii MSS.*

cient Romane feet; which ſeem to me to have been made for faſhion ſake, & dicis cauſâ (*as lamps that are found in tombes incapable of oile*) *more to expreſſe the myſtery, and profeſſion of thoſe that were to uſe them, then for to regulate the meaſure of any thing beſides them.*

Beſide theſe, I examined the ancient ſtructures of the Romanes, hoping by collating one with another, to deduce the dimenſion of their foot. For I preſumed that thoſe excellent Architects, before they began their work, muſt neceſſarily propoſe ſome models to themſelves, according to the proportions of which, they meant to raiſe their fabricks: which proportions could not be aſſigned, but in the parts of ſome common, and received quantity; and this in probability was the Romane foot; being a meaſure generally uſed, and by publick authority preſcribed. Upon which grounds, I meaſured *the ſtones in the foundation of the Capitoll, Domitians', or rather Veſpaſians' amphitheater, the triumphall arcs of Titus, and Severus, together with that of Conſtantine the great, and above all that exquiſite temple of the Pantheon,* built by *Agrippa*, I know not whither with more coſt, or art: concerning which [b] *Sebaſtianus Serlius* is of opinion, *that if all rules of Architecture were loſt, they might be revived out of this monument alone.* And in truth, this place gave me more ſatisfaction then any other. For moſt of the white marble ſtones on the pavement, contained exactly three of thoſe Romane feet on *Coſſutius'* monument, and the leſſer ſtones in Porphyry contained one and an half.

[b] *Sebaſt: Serl: delle Anticchita.*

But yet I thought this not ſufficient, unleſſe I

went to *Tarracina*, which is the ancient *Anxur*, and LIII miles distant from *Rome*: having read in [c] *Andreas Schottus*, out of *Pighius' Hercules Prodicius*, that neer the sea by the *via Appia*, in the heighth of a white rock, whence that of [d] *Horace*,

Impositum saxis latè candentibus Anxur,

there are described the Romane *decempeda*. And indeed the place is very memorable, for the whiteneſſe, altitude, and hardneſſe of the rock, which notwithſtanding is cut away perpendicularly, on the ſide towards the Tyrrhene ſea, above an hundred and twenty feet in depth, to make paſſage for the Appian way; and at the ſpace of every *decempeda*, theſe characters X XX XXX &c. (being almoſt *cubitales*) are fairly ingraven in a continued order deſcending to CXX. Meaſuring below the diſtance between CXX and CX, it amounted to IX. Engliſh feet, and $\frac{1111}{1000}$ of a foot computing it from the * line ingraven above CXX to the line next under CX. The reſt I examined with my eyes, by often comparing the diſtance between CXX and CX whither it were equall to that between CX and C, and this again (aſcending upwards) to that between C and XC. which manner though it be uncertain, and conjecturall, and farre from that exactneſſe, I uſed in all others, yet it was the beſt means I could then put in practiſe; and I am confident that whoſoever ſhall meaſure thoſe ſpaces, ſhall find a manifeſt inequality. To which opinion I am the rather induced, becauſe meaſuring there, in ſeverall places, the breadth of the Appian way, cut out of the ſame rock, I found a difference ſometimes of one, or two inches, or more. It being in one place

[c] *Andr: Schott: itinerar.*

[d] *Horat l. 1. Serm Sat. 5.*

* See at the end of this book the figure of theſe characters as they are cut in the rock at *Anxur*, with lines incompaſſing them.

place XIII. English feet, and $\frac{1620}{2000}$ of a foot, in another, XIII. feet and $\frac{1880}{2000}$ in a third XIII. and $\frac{1975}{2000}$. Whereby I concluded, that the Ancients in making that way, had not respect to a Mathematicall point (as it was not necessary) but onely that if any difference were, it should not be sensible. And such differences have I observed in the white Corinthian pillars, in the Pantheon before mentioned, of above an inch, or two, in the circuit of the *scapus*, neer the *torus*: vvhich inequality, seeing no eye could discover, the masters of that exquisite vvork did justly contemn. Whereas the Porphyry stones, and those of white marble, on the pavement, are sized so even, and so exactly to the proportions of the Romane foot, that nothing can be more accurate. And this the nature of the vvork required. For the temple being round (which hath occasioned the *Italians* vulgarly to call it the *Rotundo*) the circle within, could not so exquisitely have been filled up, if there had not been a speciall care taken in observing the true dimensions, in every particular stone. But to return to the rock at *Anxur*; the spaces between those characters, to an eye, that shall be intentively fixt upon them, will be apparently different. So that I concur in opinion with * *Schottus*, that those figures were placed there, *to give notice to posterity, how much of the rock had been removed, to make passage for the Appian way*; and not for any memoriall of the Romane measures.

* *Schotti itinet.*

Having measured those places in the Appian way at *Tarracina*, I made triall of at least XX. others

others between *Tarracina*, and *Naples*, without any great satisfaction; and therefore partly the incertainty that I found there, and partly the danger of theeves, discouraged me from measuring the Romane *milliare*; a work conceived to be of great use, for the discovery of the Romane foot. Seeing the *milliare* containing *mille passus*, as the very name imports, and every *passus* consisting of five feet, as [e] *Columella*, and [f] *Isidorus*, expresly tell us, here therefore would be 5000 feet to help us to one, could there be but found out a perfect Romane mile. And this I imagined might probably be discovered amongst those many *vestigia* of Romane waies, which to this day are frequently seen in *Italy*. Wherefore conferring with *Gasparo Berti*, a man curious, and judicious (as appears by his ichnography of *Roma Subterranea* in *Bosius*) as also with *Lucas Holstenius*, a learned companion of *Cluverius*, in those honourable travails of his, for the restauration of the ancient Geography: they both informed me, that there are still in the Appian way, where it passes over the *Pomptinæ paludes*, severall *columnæ*, or *lapides milliarii*, standing; whereby the Romanes divided, and distinguished their miles; and which occcasioned those phrases, *ad primũ*, *ad quartum*, *ad centesimum lapidem*, and the like. And these, it may be, at the first were ordinary stones, till *C. Gracchus* caused columnes to be erected in their places: Διαμετρήσας κατὰ μίλιον ὅδιον πᾶσαν (τὸ δὲ μίλιον ὄκτω σταδίων ὀλίγον ἀποδεῖ) κίονας λιθίνους σημεῖα τοῦ μέτρου κατέστησεν. *He measured out*, saith [g] Plutarch, *by miles all the waies*,

[e] *Columella de Re Rust. l. 5.*
[f] *Isiderus l. 15. c 15. Origin.*
[g] *Plutarchus in Gracchis.*

waies, the mile containing litle leſſe then eight ſtadia, and placed columnes of ſtone to deſigne the meaſure. The thing vvas of that ornament, and uſe, as that it was afterwards taken up, and continued by the Romane Emperours; as appears by theſe inſcriptions, which are fairly ingraven on the firſt columne, found amongſt the ruines in the Appian way, and from thence lately removed into the Capitol, by order of the * Senate, and people of *Rome*.

* S. P. Q. R
COLVMNAM. MILIARIAM
PRIMI. AB. VRBE. LAPIDIS. INDICEM
AB. IMPP. VESPASIANO. ET. NERVA
RESTITVTAM
DE. RVINIS. SVBVRBANIS. VIAE. APPIAE
IN. CAPITOLIVM. TRANSTVLIT

I

IMP. CAESAR
VESPASIANVS. AVG
PONTIF. MAXIM
TRIB. POTESTAT. VII
IMP. XVII P.P. CENSOR
COS. VII DESIGN. VIII

Below this, on the end of the Scapus,

IMP. NERVA. CAESAR
AVGVSTVS. PONTIFEX
MAXIMVS. TRIBVNICIA
POTESTATE. COS. III PATER
PATRIAE, REFECIT

Below this, on the Baſis of the ſame pillar.

IMP. CAESARI. DIVI
TRAIANI. PARTHICI. F
DIVI. NERVAE. NEPOTI
TRAIANO. HADRIANO
AVG. PONTIF. MAXIM
TRIB. POTEST. II COS. II
VIATORES. QVI. IPSI. ET. COS. ET
PR. CETERISQVE. MAGISTRATIB
APPARENT. ET. H.V.

To theſe I ſhall alſo add the inſcription of another *columna milliaria*, not extant in *Gruterus*, or any other, that I know, which I have ſeen at *Tarracina*; the columne being exactly of the ſame magnitude with the former, but wanting by the injury of time, a *baſis* below, & a globe, of nigh three feet diameter on the top, ſerving inſtead of a capitel, both which the former hath.

X

IMP. CAESAR
DIVI. NERVAE
FILIVS. NERVA
TRAIANVS. AVG
GERMANICVS
DACICVS
PONTIF. MAX
TRIB. POT. XIIII
IMP. VI COS. V P. P
XVIIII SILICE. SVA. PECVNIA
STRAVIT

LIII

* The figure X signifies the distance of *Tarracina* from the next City, or Town, in the way to Rome: And that was, *Ad medias*: a place so called, either because it was, *ad medias paludes*, or else because it was in the midway almost between *Tarracina*, and *Appii forum*. For it was X. miles from *Tarracina*, and IX. from *Appii forum*; as appears by the *Itinerarium Hierosolymitanum* in *Bertius*.

Appii forum
Ad medias IX.
Tarracina X.

The figure LIII below, signifies the distance of *Tarracina* from Rome: Which distance may be farther proved out of *Appian*, in his third book of the Civill wars, speaking of *Augustus*: Ὄντι αὐτῷ περὶ Ταρρακίνας ἀπὸ τετρακοσίων πυ Ῥώμης σταδίων. *Being about Tarracina, which is distant* CCCC. *stadia from Rome.* These *stadia* reduced to miles, if wee allow VII. Greek *stadia*, and an half, to a Romane mile, as *Suidas* doth, will make up LIII. miles, and one third part of a mile; that is, two *stadia*, and an half over and above. Which fraction *Appian* neglects; and therefore uses the round number CCCC. *stadia* for LIII. miles.

The figure XVIIII signifies the *Decennovium*, or way passing over the fens, between *Appii forum*, and *Tarracina*: so denominated, because it contained nineteen miles in length: which may also bee proved out of *Procopius*, where he speaks of the Δεκαννόβιον. This way was paved by *Traian*, as the inscription shews, and I think first of all by him. Long after it was repaired by *Theodoricus*, according to another inscription, that I have seen at *Tarracina*, of which *Gruterus*, and *Cluverius*, also make mention; where, omitting the titles of *Theodoricus*, in the marble we finde these words ingraven.

DECEN-

DECENNOVII. VIAE. APPIAE. ID. EST. A. TRIP
VSQVE. TERRACENAM. ITER. ET. LOCA. QVAE
CONFLVENTIBVS. AB. VTRAQVE. PARTE. PALVDVM
PER. OMNES. RETRO. PRINCIPVM. INVNDAVERANT
VSVI. PVBLICO. ET. SECVRITATI. VIANTIVM
RESTITVIT. . . . . PER
PLVRIMOS. QVI. ANTE NON. ERANT. ALBEOS
. . . . . DEDVCTA. IN. MARE. AQVA

By this number XVIIII. signifying the *decennovium*, and by the *Itinerarium Hierosolymitanum*, we may safely correct the *Itinerarium Antonini*, in which *Tarracina* is placed but XVIII. miles distant from *Appii forum*. And from hence likewise we may certainly know how farre the Christians went to meet Saint *Paul*, and that was XXXIV. miles. For so much was *Appii forum* distant from *Rome*, if we subduct XVIIII. out of LIII. whereas the Itineraries of *Bertius* Edition make it more.

If therefore two such columnes were found intire, (as I am informed there are four, or five, in the *Decennovium*, standing in a continued order) the distance between two such being exactly measured, would much conduce to the discovery of the Romane foot. Upon which supposition, I had almost resolved to have gone thither, as I did to other places, with no other intention, but only to have been a spectator of those Columnes, and to have trusted to mine own hands, in taking their distances. But upon a more deliberate examination of the businesse, I perceived that this inquiry did depend upon a very nice supposition. For if the *Decempedatores*, or *Curatores viarum*, proceeded not with extreme caution, and aimed almost at a Mathematicall point, in designing the just space of each particular mile (which in a work of that length

length is not probable; vvhere the inequality of many feet could not be diſcerned by the eye, and might be admitted without any blemiſh. For in * *Varro*'s judgement, *Senſus nullus quod abeſt mille paſſus ſentire poteſt*) it could not be, but the ſame differences, or ſomewhat like, muſt have crept in with them, which have been obſerved amongſt us, in our meaſured, and ſtatute miles; out of vvhich it vvould be a vain attempt exactly to demonſtrate the Engliſh foot. The neglect of which circumſpection, amongſt ſome other reaſons, that may be aſſigned, I take to be one, of the diverſity, which Aſtronomers found in that memorable obſervation, made in the plaines of Singiar, or Sinar, by the command of *Almamon*, the renowned Caliſe of Babylon, about eight hundred years ſince, in proportioning the magnitude of a degree upon earth. For having taken the altitude of the pole at two ſeverall ſtations, differing a degree in the heavens, they meaſured the diſtance between theſe ſtations on earth, going on in the ſame Meridian; vvhere [h] *ſome of them*, ſaies Abulfeda, *found it to be fifty ſixe miles, and two thirds, others fifty ſix, vvithout any fraction.* If therefore the Romane *decempedatores*, or *geodeta*, uſed not more circumſpection, then the Babylonian Aſtronomers (which is not likely), there can be no truſt given to their miles, and leſſe truſt to the foot, that ſhall be deduced thence.

Wherefore to come to a concluſion; having made inquiry more waies, then it may be any man hath done, and I think vvith as much caution, and exactneſſe, as any, it will be neceſſary after

* *Varro de L. L. lib. 5.*

[h] فكان مع احدهما ستة وخمسون ميلا وثلثا ومع الاخري ستة وخمسون ميل بغير كسر *Abulf Geogr: Arab: MS.*

after all to shew amongst so many feet, as are taken to be Romane, vvhich I conceive to be the most genuine, and true. And though in such an incertainty, and scarcity of ancient monuments, and in such a diversity of opinions, amongst modern Writers, it may seem too great presumption, positively to define the magnitude of the Romane foot; yet having had the opportunity, to have perus'd in this kind, more antiquities, then any that have preceded, I may with the more confidence conclude, that the *Pes Colotianus*, in my judgment, is the true Romane foot; and that for these reasons.

For first, it most exactly agrees with some very ancient, and perfect Romane feet in brasse, found long since amongst the *rudera* at *Rome*: especially with that excellent one (as I remember) of *F. Vrsinus*, a learned Antiquary. Though I cannot deny but that I have seen two ancient feet in brasse, different from this; the one of *Gualdus*, a very fair one, wanting two parts and an half, of such as this contains a 1000. a small, and inconsiderable difference. The second of *Gottifridus*, a Gentleman of honourable quality, (to vvhom I stand obliged for the free donation of severall antiquities) which exceeds it by eight parts; but this last hath been made by a very rude, and unskillfull hand.

Next, the proportions of almost all the white marble stones, as also of those lesser in porphyry, in the pavement of that admirable temple of the *Pantheon*, are either completely three of these feet, or one and an half; which,

it

it is not probable, in a ſtructure of ſo much art, ſhould have been the vvork of chance. Add to this the dimenſions of ſeverall ſtones, in the foundation of the *Capitol*, in *Titus*, and *Severus*, triumphal arc's, correſponding either to the whole foot, or conjointly to the whole, and ſome *uncia*, or digits of it.

Thirdly, the inſcription on the ſame monument, vvhere this foot is found, of the *circinus*, the *libella*, the *norma*, and the like, plainly ſhew that theſe were intended to expreſſe *Coſſutius'* profeſſion, (whom [i] *Patus* imagines to have been a *ſculptor*) and this being intended, I ſee no reaſon why the Romane foot ſhould have been cut in ſo fair a relevy, either too ſhort, or too long; when the ſame hand, and the ſame pains, might have made it exact. It is true, that the foot upon *Statilius'* tombe, is 944. ſuch parts, as this is but 1934. whereof the Engliſh foot taken by me from the iron yard, or ſtandard of three feet in Guildhall in *London*, contains 2000: but how rudely in reſpect of digits, that foot of *Statilius* is deſcribed, I have before diſcovered. And therefore I wonder that [k] *Philander* in his Commentaries upon *Vitruvius*, ſhould in a matter of ſuch high concernment in Architecture, proceed vvith ſo much inadvercncy, affirming that between this of *Statilius*, & that of *Coſſutius*, there is no difference. And he a Mathematician, hath thus erred, (though commonly men verſed in thoſe ſciences take not up things at too cheap a rate, without due examination) what opinion may vve conceive of another obſervation, made at the ſame monu-

[i] *Luc. Patus lib. 1 de antiq. Rom. & Græc. interval. menſuris.*

[k] *Philander in li. 3. c. 3. Vitruvii.*

ment, by [1] *Ant. Augustinus, Jo: Baptista Sighicellus, P. Octavius Pacatus, Achilles Massaeus, Achilles Statius, Benedictus Ægius, Fulvius Vrsinus, Latinus Latinius*, with as many ancient feet, as there were men present? I shrewdly suspect they slubbered over their observation, as not regarding in nineteen hundred parts, and better, the small excesse, or defect, of ten parts: or not rightly apprehending what might be the consequences of such an errour, how litle soever, in measuring the vast magnitude of the terrestriall globe, or of the celestiall bodies.

[1] *Ciaconius è Latini Latinii observ. de pede Rom.*

Lastly, besides the authorities of *Portius Vicentinus, Georgius Agricola, Glareanus, Ghetaldus, Donatus*, and of many other learned, and judicious men, who approve of this *Pes Colotianus*, (though bare authority is the worst, because the weakest kinde of argument) that excellent *Congius* of *Vespasian*, now extant in *Rome*, so highly and so justly magnified by [m] *Villalpandus*, may likewise serve to confirm, if not totally my assertion, yet thus far, that I have not exceeded in assigning the true longitude. For by the cleer evidences of [n] *Dioscorides*, and of an *anonymus Authour* before cited, eight *Congii* are the just measure of the Romane *amphora*, or *quadrantal*, and again by as many testimonies of [o] *Sextus Pompeius*, and [p] *Rhemnius Fannius*, each of the sides of the *amphora* is equall in longitude to the Romane foot. Wherefore having procured by speciall favour the *congius* of *Vespasian*, I took the measure of it with * *milium* (being next to water, very proper for such a work) carefully prepared, and cleansed, which being done, with much

[m] *Villalpandus l. 2 disp. 2. c. 11 de apparatu Vrbis ac Templi.*
[n] *Fragmenta Dioscoridis.*
[o] *Sext. Pomp. Festus de Verb. signif.*
[p] *Rhemn Fann. carm. fragm:*
* It had been better to have made my experiment with water, and then to have weighed it with an exact balance: but because no balances are found in *Rome* so exact as with us, I was fain to measure it with *milium*.

much diligence I cauſed a cube to be made anſwerable to the true dimenſion of the *Pes Colotianus*; filling up the capacity of which, and often reiterating the ſame experiment, I found continually the exceſſe of about half a *congius* to remain, and that an *amphora* made by the *Pes Colotianus*, would contain but VII. *congii*, and about an half. And therefore I cannot ſufficiently wonder at the obſervation [r] of *Ant. Auguſtinus*, *Pacatus*, *Maffæus*, *Statius*, *Vrſinus*, and others, with a cube of that foot, which is deſcribed on *Statilius'* monument: who affirme the *quadrantal* of this exactly to contain eight of theſe *congii* of *Veſpaſian*. Whereas upon due examination I confidently affirm, that they have erred. And therefore [s] *Villalpandus* in this particular, with more judgement, and ingenuity, hath publiſhed his obſervation, concerning the meaſure, and preciſe weight, of *Veſpaſians' congius*, then any other whatſoever. Although I cannot be induced to aſſent to that deduction, which he infers of the Romane foot, (from the ſide of a *quadrantal* containing eight of theſe *congii*) relying upon the authorities of *Feſtus*, and *Fannius*, againſt ſo many evidences, produced to the contrary. Wherefore as he is ſingular in his opinion (for there is not one author of credit, which follows his aſſertion) ſo is his foot as ſingular, there being not one, of at leaſt ten ancient ones, in the hands of ſeverall Antiquaries (beſides thoſe inſcribed on two Monuments in *Rome*) vvhich arrive to the proportions of his, by XXVII. parts in 2000. As for thoſe other fancies of his (for they are no bet-

[r] *Ciatonius è Latini Latinii obſervationibus de pede Rom. Cum veram pedis Rom. quantitatem ſtatuere vellent ejuſd. pedis menſuras ſimul contulerunt, & earum octo cum antiquiſſima dicti pedis forma, quæ in baſi quadam in hortis Vaticanis exſtat, adamuſſim convenire videntes, ex hoc pede quadrato vas confecerunt &c. Vide ſupra.*

[s] *Villalp. de apparatu Vrbis ac Templi par. 2. lib. 3. c. 25.*

ter) of describing also the Romane foot, by the altitude of *Vespasians' congius*, and assigning the [t] *latus cubicum*, of the *modius*, the *semicongius*, the *sextarius*, and *hemina*, from certain parallel circles circumscribed about it, (which certainly, as the scheme of the *congius* it self, drawn by me to the full proportion, shews, were delineated without any farther intention then for ornament) I doe not think them worth the confutation.

[t] *Vides etiam latus cubicum modii, semicongii, sextarii, heminæ &c. Villalp. ibidem.*

And therefore it will be much better to give some solution to those authorities of *Sextus Pompeius*, and *Rhemnius Fannius*, alleaged by him. For the objection which may be raised thence is very materiall: How the *Pes Colotianus* can be the true Romane foot, since it is confessed by me, that it doth not precisely answer to the sides of a *quadrantal*, or cube, containing eight of those *congii* of *Vespasian*, or XLVIII. *sextarii*? Whereas on the contrary, *Festus* expresly writes, that the *quadrantal* was the square (he means the cube) of the Romane foot.

[u] *Quadrantal vocabant Antiqui, quam ex Graeco amphoram dicunt, quod vas pedis quadrati, octoginta & quadraginta capit sextarios.* And [x] *Fannius* confirms the same.

[u] *Sext. Pomp. Festus de Verb. signif.*

[x] *Rhemn. Fannii carmina de pond. & mensuris.*

Pes longo spatio, latóque notetur in anglo,
Angulus ut par sit, quem claudit linea triplex
Quattuor ex quadris medium cingatur inane
Amphora fit cubus: quam ne violare liceret,
Sacravêre Iovi Tarpeio in monte Quirites.

We might elevate their authorities by saying, these are only the testimonies of two Grammarians

marians, better verſed in diſputes of vvords, then criticall in meaſures, which more properly are the ſpeculation of Mathematicians: and therefore if *Vitruvius* had affirmed it, much more credit might have been given. But we ſhall rather ſay, they wrote vvhat was vulgarly, and commonly, upon tradition beleeved, that the length of one of the ſides of the *amphora* was equall to the Romane foot: not that it was preciſely, and exactly equall, but that of any known meaſure vvhatſoever then extant, this came the neereſt to it, as indeed it doth; yea, ſo neer, that if at this day the *amphora*, and Romane foot, were in uſe amongſt us, many a writer that had never been ſo curious, as diligently to compare them, would not be ſcrupulous to affirm as much. Which may appear by the practiſe of *Ant. Auguſtinus*, *Pacatus*, *Maffæus*, *Statius*, *Vrſinus*, and of ſeverall other learned men, not long before our times: Who though they purpoſely made it their inquiry, to diſcover the true Romane vveights, and meaſures, and therefore made ſpeciall uſe of this *Congius* of *Veſpaſian*, yet have no leſſe erred, as we ſhewed before, in the dimenſion of the *amphora*, then both *Feſtus*, and *Fannius* have done. Neither will this anſwer ſeem improbable conterning meaſures, if we ſhall examine a place, r two, concerning coins, in which the ancints, and thoſe too of the better ſort of Auhors, have in the very ſame manner erred. For *Livy* writing that *Marcellus* gave to *L. Bans* (or *Bandius*) IↃ. *bigati*, that is *denarii* (ſo alled becauſe the *biga* was ordinarily ſtamped upon

[1] *Livius l. 23.*

upon the reverſe of the *Denarius*): [z] *Plutarch* deſcribing the ſame gift, renders it by ſo many *drachmæ*, the Grecian manner of computation; not that the *drachma* in the exact, and intrinſecal valuation, was equall then to the *Denarius*, or the *Denarius* to the *drachma* (as we ſhall ſhew in the inſuing diſcourſe) but that in the vulgar, and popular eſtimation, the one paſſed for the other, being both not much different in their weight, as well as valuation. [a] Likewiſe *Dio* informs us, that *Octavius* promiſed the *Veterane* ſouldiers $\overline{\text{X}}$. *drachmæ* a man: whereas [b] *Cicero* expreſſing the ſame thing to *Atticus* terms them $\overline{\text{X}}$. *denarii*. And *Suetonius* writes that *Cæſar* by Teſtament gave to each of the common people *ſeſtertia trecenta*, that is, $\overline{\text{LXXV}}$. *denarios*, which [c] *Plutarch* both in the life of *Brutus*, and of *Antonius*, renders ἑβδομήκοντα πέντε *ſeventy five drachmes*. In like manner we may ſay, that *Feſtus*, and *Fannius*, have deſcribed the *amphora* by the Romane foot; not as if this were the exact meaſure of it, but as being the moſt known, and neereſt proportion, in which without falling into fractions, it might eevenly and roundly be expreſſed.

[z] *Plutarchus in Marcello.*

[a] *Dio lib. 45. in Cæſare Octav.*

[b] *Cicero lib. 16. 5. ep. ad Atticum.*

[c] *Plut. in Bruto. Idem in Antonio.*

And thus have we finiſhed our inquiry after the Romane foot: our next labour ſhould be to

to compare it with the present Standards, and Originals, for measures of divers Nations. For which I must refer the Reader to this insuing Table.

The Romane foot compared with the measures of divers Nations.

SVch parts as the Romane foot, or that on the monument of *Coſſutius* in *Rome*, contains	1000	
The foot on the monument of *Statilius* in *Rome*, contains	1005	17/18
The foot of *Villalpandus*, deduced from the *Congius* of *Veſpaſian*, contains	1019	65
The ancient Greek foot, being in proportion to the ancient Roman foot, as XXV to XXIV, contains	1041	67
The Engliſh foot	1034	11
The Paris foot	1104	45
The Venetian foot	1201	67
The Rhinland foot, or that of *Snellius*	1067	21
The Derah, or cubit, at *Cairo* in *Ægypt*	1886	25
The Perſian arish	3305	12
The greater Turkiſh pike at *Conſtantinople*	2275	2
The leſſer Turkiſh pike at *Conſtantinople*, is in proportion to the greater, as 31 to 32		
The braccio at *Florence*	1978	22
The braccio for wollen at *Siena*	1284	15
The braccio for linnen at *Siena*	2041	17
The braccio at *Naples*	2171	42
The canna at *Naples*	7114	72
The vara at *Almaria* and at *Gibraltar* in *Spain*	2854	2
Il palmo di Architetti at *Rome*, whereof X make the *canna di Architetti*	756	8
Il palmo del braccio di Mercantia, & di Teſſito di Tela at *Rome*; this and the former are both ingraven in a white marble ſtone in the Capitol with this inſcription, *Curante Lu. Pario*	719	22
The *Genoa* palm	842	92
The *Antwerp* ell	2360	20
The *Amſterdam* ell	2345	44
The *Leyden* ell	2337	23

The Engliſh foot taken from the iron Standard at Guild-hall *in* London, *and compared With the Standards for meaſures of divers Nations.*

Such parts as the Engliſh foot contains	1000
The Romane foot, or that on the monument of *Coſſutius* in *Rome*, contains	967
The foot on the monument of *Statilius* in *Rome*, contains	972
The foot of *Villalpandus*, deduced from the *Congius* of *Veſpaſian*, contains	586
The Greek foot	1007 $\frac{29}{100}$
The Paris foot	1068
The Venetian foot	1162
The Rhinland foot, or that of *Snellius*	1033
The Derah, or cubit, at *Cairo* in *Ægypt*	1824
The Perſian ariſh	3197
The greater Turkiſh pike at *Conſtantinople*	2200
The leſſer Turkiſh pike at *Conſtantinople* is in proportion to the greater, as 31 to 32	
The braccio at *Florence*	1913
The braccio for wollen at *Siena*	1242
The braccio for linnen at *Siena*	1974
The braccio at *Naples*	2100
The canna at *Naples*	6880
The vara at *Almaria* & at *Gibraltar* in *Spain*	2760
Il palmo di Architetti at *Rome*, whereof X make the *canna di Architeti*	732
Il palmo del braccio di Mercantia, & di Teſſito di Tela at *Rome*: this and the former are both ingraven in a white marble ſtone in the Capitol with this inſcription *Curante Lu. Pæto*	695 $\frac{1}{3}$
The *Genoa* palm	815
The *Anwerp* ell	2283
The *Amſterdam* ell	2268
The *Leyden* ell	2260

This Table I made by the Standards, the former by proportion.

OF

OF THE DENARIVS.

AS I have made for measures the Romane foot, the foundation of my inquiry, and therefore have handled it in the precedent Treatise: so for finding out of weights, I shal take the *denarius* as an undeniable principle, from whence those of the ancients by a necessary consequence may be inferred. For as the unity is in respect of numbers, or the *sestertius* in discourses *de re nummariâ*: so is the *denarius* for weights, a fit rise, or beginning, from whence the rest may be deduced. Not but that it were better (as I gave the caution before) if we absolutely consider the exactest waies of discovering weights, to begin with the greater, and by them to find out the lesse, then by the lesse, to produce the greater; but if we look upon the condition of times, and consider the means that are left after so many revolutions, and changes of the Romane Empire, it will be safer to alter our method. For to this day there are many thousand *denarii* left, and amongst these some so perfect, and intire, as if they had been but newly brought from the mint, whereas of the Romane *libra*, and ounces, there are but few extant, if compared with these. *Lipsius*, and *Gruterus* in their inscriptions mention some, and *Patus* some others, besides such as I have seen in the hands of Antiquaries, and many of mine own: most of which differ from one another, either as having been consumed by

by ruſt, and time, or it may be alſo by the men that then lived, for their advantage leſſened: a thing too often practiſed amongſt us. Wherefore I think it more convenient by the *denarius* to deduce the proof, and evidence of theſe, then by the diverſity, and uncertainty of theſe to conclude the *denarius*: And yet if ſome of the beſt, and faireſt of them, ſhall agree with this, I ſhall think my ſelf ſo much the more aſſured.

Now ſeeing the *denarius* may be conſidered in a double reſpect, either as *nummus*, or as *pondus*: in the firſt acception, the valuation of it in civill affairs is remarkable, in the later, the gravity, and ponderouſneſſe: I ſhall ſpeak no farther of the former, then as it may conduce in ſome ſort to illuſtrate the later. The *denarius* was a ſilver coin in uſe amongſt the Romanes, paſſing at the firſt inſtitution for *dena aera*, or ten *aſſes*. And ſo [a] *Vitruvius* expreſly writes, *Noſtri autem primò decem fecerunt antiquum numerum, & in denario denos æreos aſſes conſtituerunt.* The ſame thing is atteſted by [b] *Voluſius Metianus. Denarius primò aſſes decem valebat, unde & nomen traxit.* [c] *Pliny*, beſides a confirmation of the ſame valuation, aſſigns alſo the time, in which it was firſt ſtamped. *Argentum ſignatum eſt anno Vrbis* * *quingenteſimo octogeſimo quinto, Q. Fabio conſule, quinque annis ante primum bellum Punicum, & placuit denarius pro decem libris æris:* that is, for ten *aſſes*. For the *aſſes* both then, and under the firſt Conſuls were *librales*. *Dionyſius Halicarnaſſeus.* [γ] Ην δὲ ἀσσάριον, χάλκεον νόμισμα, βάρος λιτραῖον. The *aſſis* was a braſſe coine, *weighing a pound*. Where by the way it is worth the obſervation,

[a] *Vitruv. l. 3. c. 1.*

[b] *Vol. Metianus de aſſis diſtributione.*

[c] *Plinius l. 33. c. 3.*

* *Budæus l. 5 de aſſe*, corrects theſe numbers by *Livy* (*l.* xxx) and reads them 478.

vation, the ſtrange, and in mine opinion, the unadviſed proportion, betwixt the braſſe, and ſilver monies, of thoſe times: that X. pounds of braſſe ſhould be but anſwerable to the 84th part (for ſo much, or neer it, was the *denarius*) of a pound of ſilver; or to ſpeak more cleerly, that one pound in ſilver ſhould be equall in valuation to 840 pounds in braſſe. Neither can there be any excuſe of that errour, unleſſe this, that there then was an infinite plenty of the one, and as great a ſcarcity of the other. However it were, the ſame proportion is teſtified by *Varro*, who farther addes; that the Romanes took the firſt uſe, and invention of the *denarius*, from the *Sicilians*. [d] *In argento nummi, id à Siculis, denarii quòd denos aris valebant.* And according to this valuation the *denarius* had an impreſſe upon it of the figure X, denoting the *decuſſis*, or number of the *aſſes*, as *Valerius Probus* witneſſes, and ſometimes this character ⧖; both vvhich I have ſeen, and can ſhew, in ſeverall ancient ones. This later by the ignorance of Scribes formerly in *MSS.* and of our Printers of late in the edition of *Celſus*, and of *Scribonius Largus*, is repreſented by an aſteriſc *; and by a worſe errour in the ſame authors, the figure X expreſſing the *denarius*, as a *pondus*, is confounded with the figure X expreſſing a number. From this figure on the *denarius*, or *decuſſis*, [e] *Vitruvius* cals the interſections of lines, *decuſſes*, and *decuſſationes*. And [f] *Columella* uſeth the phraſe *in ſtellam decuſſari*, when lines meet diamond-wiſe, or lozenge-like, as theſe in the character X or ⧖. Neither did the

[d] *Varro l. 4. de Ling. Lat.*

[e] *Vitruv. l. 10.*

[f] *Columella l. 5.*

denarius

denarius long paſſe at the valuation of X. *aſſes*, nor the *aſſes* which before, and then were *librales*, continue at one ſtay, but with the exigencies of the Romane State, the rate of the *denarius* roſe, and the weight of the *aſſes* fell; that is in effect, both the ſilver, and the braſſe monies, came to be augmented in their eſtimation. For by a publick edict of *Fabius Maximus* the *Dictator*, the Common-wealth being hardly preſſed upon by *Hannibal*, the *denarius* came to be priced at XVI. *aſſes*, and the *aſſes* which were then *ſextantarii*, or the ſixth part of the Romane pound, (for in the firſt Punick war, by reaſon of the exceſſive expenſes of the State, they firſt fell from being *librales*, to be *ſextantarii*) came now in the ſecond Punick war to be *unciales*. The whole progreſſe, and manner of this alteration, is by none ſo well, and fully expreſt as by [s] *Pliny*, and therefore I ſhall a litle inſiſt upon his words. *Silver*, ſaies he, *came to be coined in the* 585th *year of the City, Q. Fabius being Conſul, five years before the firſt Punick war, and then the denarius paſſed for* X. *pounds of braſſe, the Quinarius for five, the ſeſtertius for two pounds and an half. The weight of the aſſis in braſſe was diminiſhed in the firſt Punick war, the Common-wealth not being able to ſupport the expenſes, and then it was decreed that the aſſes ſhould be coined ſextantario pondere*; that is, with the weight of the ſixth part of a pound, or two ounces, whereas before they were *librales*. Though *Alciatus* here upon a very groſſe miſtake contends that they were then coined *dextantario pondere*, and not *ſextantario*, but yet that they were

[s] *Argentum ſignatum eſt Anno Vrbis* CCIXXXV. *Q. Fabio Coſ. quinque annis ante primum bellum Punicũ. Et placuit denarius pro* X *libris æris; quinarius pro quinque, ſeſtertium pro dupondio, ac ſemiſſe. Libra autem pondus æris immutatum bello Punico primo, cum impenſis Reſp. non ſufficeret, conſtitutumque ut aſſes ſextantario pondere ferirentur. Plin. lib.* 33. 3.

were called *asses sextantarii*, because the *sextans* or sixth part of an ounce was wanting: whereas [h] *Festus* expresly writes. *Grave æs dictum à pondere, quia deni asses singuli pondo libræ efficiebant denarium ab hoc ipso numero dictum: sed bello Punico populus Romanus pressus ære alieno, ex singulis assibus libralibus senos fecit, qui tantundem valerent.* And these words of *Pliny*, which immediately follow those before recited, put it out of controversie. [i] *Whereby*, saies he, *five parts were gained, & the debts (of the Common-wealth) discharged.* I would gladly see by what Arithmetick *Alciatus* can demonstrate, that the Common-wealth shall gain five parts, making the *asses sextantarii* in his sense; whereas on the contrary, taking them in this interpretation (as both [k] *Agricola*, and [l] *Villalpandus* doe) it is a thing most evident. For the whole pound, or *assis*, before consisting of XII. ounces, being now reduced to two ounces, and these two passing at as high a rate in the valuation of things vendible, as the vvhole *libra* did, it is plain that the Common-wealth by this diminution of weight, keeping the same constant tenure of the estimation of the *assis*, gained ten parts in twelve, that is, five in six; and not one in six, as *Alciatus* would have it. But to omit this digression, and to return to [m] *Pliny*. *Afterwards being oppressed by Hannibal, under Q. Fabius Maximus the Dictator, the asses were made unciales, and the denarius passed for* XVI. *asses, the quinarius for* VIII. *and the sestertius for* IIII. *And hereby the Common-wealth gained half, yet in the pay of the Militia the denarius was valued at ac-*

[h] *Sext. Pompeius Fest. de verb. signif.*

[i] *Plin. l. 33 c. 3. Ita quinque partes factæ lucri dissolutumque æs alienum.*

[k] *Agricola lib. 2 de ponder. & temperat. monetarum.*

[l] *Villalp. de appar. urbis ac templi par. 2. l. 2 disp. cap 9.*

[m] *Postea Hannibale urgente, Q. Fabio Maximo Dictatore, asses unciales facti: placuitque denarium* XVI. *assibus permutari, quinarium octonis sestertium quaternis: Ita Resp. dimidiu lucrata est. In militari tamen stipendio*

accounted for ten asses. The impresse of the silver [that is, of the denarius] were the biga, and quadriga; from whence they are called bigati, and quadrigati. Not long after by the lex Papiria the asses came to be semunciales. Livius Drusus Tribune of the people mixed an eighth part of brasse with the silver: thus far Pliny. Out of which words it is most evident (omitting many passages of his, worth our consideration) that as the *denarius* at the first institution passed for ten *asses*, so afterwards it was valued at XVI. And *Vitruvius* gives a reason why next to ten, they made choice of XVI. rather then of XII. or any other proportion. [n] *Quoniam animadverterunt utrosque numeros esse perfectos, & sex, & decem, utrosque in unum conjecerunt, & fecerunt perfectissimum decussissexi*, where [o] *Budæus* reads *decussissexis*: but [p] *Villalpandus decussisex*, that it may the better, as he imagines, answer to the Greek δεκάξ. [q] *Hujus autem rei*, saith Vitruvius, *antorem invenerunt pedem. E cubito enim cùm dempti sint palmi duo, relinquitur pes quatuor palmorum, palmus autem habet quatuor digitos, ita efficitur uti pes habeat sexdecim digitos, & totidem asses æreos denarius.* [r] *Metianus* also purposely treating of this argument, after that he had related that the *denarius*, at the first institution, was valued at ten *asses*, adds *now it is worth sixteen*. And not to cite more authorities, the impresse or stamp of XVI; as well as of X found upon several *denarii*, and seen both by [s] *Antonius Augustinus* (a man very accurate in coins, as appears by his dialogues) and by *Villalpandus*, besides one with the inscription

semper denarius pro X assibus datus. Nota argenti fuere bigæ atque quadrigæ, & inde bigati, quadrigatique dicti. Mox lege Papiria semunciales asses facti. Livius Drusus in Tribunatu plebis octavam partem æris argento miscuit. Plin. l. 33. c. 3.

[n] *Vitruv. l. 3. c. 1*

[o] *Budæus l. 5. de asse.*

[p] *Villalp. de apparatu Urbis ac Templi.*

[q] *Vitruv. l. 3. c. 1*

[r] *Vol. Metianus de assis distrib.*

[s] *Anton. August. dialogo. 1.*

inſcription of *C. Titinius*, with the ſame cha-
[t] *Dalechampius in Plin. l. 33. c. 3* cter, mentioned by *Fulvius Vrſinus*, and [t] *Dale-champius*, puts it out of controverſie. And this valuation of the *denarius*, as it is more then probable, continued from the firſt inſtitution of it in the ſecond Punick war, without any interruption, to *Juſtinians'* time, and it is likely longer; ſince there is no proof out of any ancient Author, nor any character on any ancient *denarius*, found to the contrary. As for thoſe authorities, which are alleaged, and preſſed by *Budæus*, and *Alciatus*, of *Varro*, *Apuleius*, *Arruntius*, and *Pompeius*, affirming, that after the ſecond Punick war, the *denarius* contained ten *aſſes*, the *Quinarius*, or *Victoriatus* five, the *ſeſtertius* two and an half: we may give a true, and eaſie ſolution, that theſe Writers expreſſed the valuation of them, as they were in their firſt originall, and beginning, with reflection to their primitive denomination: in which reſpect the *Treviri monetales*, or officers of the mint, uſually imprinted on the *denarius* the character X, rather then XVI. the former being the impreſſe of its firſt inſtitution, and the latter of its after valuation. And ſo in like manner may thoſe citations be anſwered of *Plutarch*, *Dionyſius*, and others, produced by ſome learned men to ſtrengthen their aſſertion, that the *denarius* after the ſecond Punick warre returned to its firſt eſtimation. Which thing could not have been effected, without extreme loſſe, and prejudice to particular men, in their private fortunes, and eſtates; which the juſtice, and wiſdome of the Romane Senate, under the Conſuls, was not likely to have

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introduced, or the people to have admitted.

To conclude, the *denarius*, as it is evident by many irrefragable authorities before alleaged, in the higheſt valuation paſſed for ſixteen *aſſes*, and according to that proportion the *quinarius*, or *Victoriatus* for eight, the *ſeſtertius* for four: but in the loweſt valuation, or firſt inſtitution, it paſſed for ten *aſſes*: and then the proportion of the *quinarius* was five, of the *ſeſtertius* two *aſſes* and an half, and therefore was thus marked IIS, or thus HS. as the *Quinarius* had this character, V. and alſo this X, as it is to be ſeen in a *Victoriatus* of mine own (beſides ſeveral others) with the face & inſcription of *M. Cato*. By which coin that place may not unfitly be explained, which troubled [x] *Budæus*, why the *Ordo decuſſatus*, and *ordo quincuncialis*, ſignifie in the ranking of trees the ſame thing, although the *quinarius*, or *quincunx*, give the denomination to the one, & the *denarius*, or *decuſſis*, to the other. The reaſon is, becauſe the *Quinarius* had the character X imprinted on it, as well as the *denarius*, or *decuſſis*. Beſides in *Temporarius*, wee finde the *quincunx* to bee thus ⁘ repreſented, as the *uncia* thus · ſo that five of theſe *unciæ* making the *quincunx*, and theſe five being ranged like the figure X (the character of the *decuſſis*) it is no wonder if the *ordo decuſſatus*, and *quincuncialis*, were taken for the ſame.

[x] *Budæus l. 1. de aſſe.*

Cod. MS. Temporarii.

That the *denarius* ſhould have paſſed at any other rate between $\overline{XVI}$, and $\overline{X}$. *aſſes*, as there is no coin extant to prove it, ſo there is no expreſſe authority to conclude it. Though ſome

infer out of [y] *Polybius*, that it was valued also at X̄II. *asses*: becauſe he defines the ἡμιωβόλιον, or *ſemiſſis*, to be τέταρτον μέρος ὀβολοῦ, *the fourth part of the Attick obolus*; and ſix *oboli* being in the δραχμὴ, to which *drachma* they ſuppoſe the *denarius* equall, therefore there muſt be X̄XIV. *ſemiſſes*, or X̄II. *aſſes* in the *denarius*. But with much better reaſon we may hence infer, that the *drachma* was ſomewhat bigger then the *denarius*, as we ſhall prove in this inſuing diſcourſe; and therefore *Polybius* allows X̄II. *aſſes* to it: whereas, if it had been preciſely equall to the *denarius*, he would have valued it at X̄, or elſe X̄VI. of the leſſer ſort of *aſſes*. So that Sir *H. Savile*, a man of exquiſite judgment and learning, in his diſcourſe at the end of *Tacitus*, juſtly blames *Hottoman* for altering the text of *Polybius*, and is himſelf to be cenſured, as alſo [a] *Lipſius*, in inferring thence that the *denarius* contained X̄II. *aſſes*.

[y] *Polyb. l. 2.*

[a] *Lipſius Elector. 1, 6. 2.*

The ſeverall parts of the *denarius*, excepting the *quinarius*, and *ſeſtertius*, of both which I have ſpoken before, are all comprized in this deſcription of [b] *Varro*, with which I ſhall conclude. *Nummi denarii decima libella, quòd libram pondo as valebat, & erat ex argento parva; ſembella quòd ſit libellæ dimidium quòd ſemis aſſis. Teruncius a tribus unciis ſembellæ quod valet dimidium, & eſt quarta pars ſicut quadrans aſſis.* By which proportions it appears, that the *libella* was the Xth part of the *denarius*, when it was current at ten *aſſes*, the *ſembella* the XXth, the *teruncius* the XLth. And thus much of the *denarius* as it is *nummus*.

[b] *Varro lib. 4. de Ling. Lat.*

The

The ſecond, and our principall conſideration of the *denarius* is as it is *pondus*. In which acception it will be neceſſary to præmiſe a ſecond diſtinction; that the *denarius* was either * *Conſularis*, or *Cæſareus*. The *Conſularis* was that which was made under the government of the City by the Conſuls, the *Cæſareus* under the Cæſars: The *Conſularis*, (I mean the *Conſularis* after the ſecond Punick war, and under the later Conſuls) contained preciſely the ſeventh part of the Romane ounce, as the other did the eighth part, or ſomewhat neer it.

First, that the *denarius Conſularis* of the later Conſuls, was the ſeventh part of the Romane ounce: this ſhall be our principall inquiry, becauſe it is more evident of the two, and will give us the beſt light to diſcover the true weight of the *denarius*, in the notion, and acception of the ancients, both Greeks and Latines. It is moſt apparent both by ſeverall fair coins, which I have peruſed of the later Conſuls, as alſo by *Cornelius Celſus*, who lived in the beginning of the Romane Emperors,

* The *Conſularis* again may be conſidered either in the time of the former, or of the later Conſuls: that of the former Conſuls, at the firſt inſtitution of it by *Q. Fabius* five years before the firſt Punick war, *Peireſkius* not improbably imagines to have been the ſixth part of the Romane ounce: and *Agricola* by comparing it with the *talentum Atticum*, which *Varro* values at 15000. *ſeſtertii*, and with the *tetradrachme*, which *Livy* (*lib.* 4.) eſtimates *trium fere denariorum*, as alſo upon the authority of the Scholiaſt of *Nicander*, who equals the *denarius* to a drachme and an half, as *Priſcian* doth to a drachme and a third part, I ſay *Agricola* aſſignes to it almoſt the ſame proportion with *Peireſkius*. But becauſe I have ſeen no *denarii Conſulares* of ſo great antiquity, and theſe authorities may perchance admit of other conſtructions, I ſhall leave this opinion as onely probable, and follow what is more certain, and demonſtrative, of the later Conſuls.

before there happened a generall diminution o
the *denarius*, that it was then the ſeventh pa
of the ounce, who thus writes, [c] *Sed & ante*
[c] *Celſus lib. 5. c. 17.* *ſciri volo in unciâ pondus denariorum eſſe ſeptem*
The ſame proportion is alſo expreſſed by [d] *Scri*
[d] *Scrib. Largus in præfatione.* *bonius Largus*, who lived not long after *Celſu*
as ſome imagine, his words are theſe. *Erit a*
tem nota denarii unius pro Græcâ drachmâ; aqu
enim in librâ denarii octoginta quatuor apud no
quot drachmæ apud Græcos incurrunt. [e] *Pliny* alſ
[e] *Plinius l. 33. c. 9.* confirms the ſame. *Miſcuit denario triumv*
Antonius ferrum, alii (he means under the Em
perours) *è pondere ſubtrahunt, cùm ſit juſtum octo*
ginta quatuor è libris ſignari. Out of vvhic
vvords of his, and of *Scribonius Largus*, it wi
by a neceſſary conſequence be inferred, that t
true weight of the *denarius Conſularis* is the ſ
venth part of an ounce. For if we multip
twelve the number of the ounces in the Roma
libra (as by all it is confeſt) by ſeven the numb
of the *denarii*, of which the ounce then conſiſte
the ſum will be LXXXIIII. *denarii*; and ſo ma
ſay *Scribonius*, and *Pliny*, ought juſtly to be
the Romane pound. And theſe are the one
cleer, and poſitive authorities that are to
found in Claſſicall Authours; moſt of the w
tings of the Ancients *de ponderibus & menſur*
having long ſince been loſt; or elſe thoſe f
fragments that are left, of *Cleopatra*, *Dioſcori*
and of others, are ſo corrupted, that litle tr
with any certainty can be collected. Fr
whence it will by way of corollary follow, t
if either the *denarius Conſularis* be given, the R
ma

mane ounce, and *libra*, in the ſame proportion will neceſſarily be thence deduced; or if the Romane ounce, and *libra* be given, the *denarius* will as neceſſarily be concluded.

But before we farther treat of this argument, we ſhall indevour alſo to demonſtrate the *denarius*, by the *drachma Attica*. For *Scribonius* ſeems, and ſo doe other ancients, to make them equall. And therefore *Pliny* writes: [f] *Drachma Attica denarii argentei habet pondus*: whereas the *drachma Æginæa* vvas much larger, this containing X. ſuch *oboli* as the Attick contained VI. and therefore the *Athenians* in hatred of the *Æginæans* called it πιχῆαν δεαχμὴν, as [g] *Pollux* teſtifies. And here as we conſidered the *denarius*, as *nummus*, and as *pondus*; ſo likewiſe muſt we take the *drachma Attica*, as *nummus*, and as *pondus*: in the proſecution of both vvhich relatively to the *denarius*, I ſhall inſiſt ſo much the longer, becauſe it is an argument that hath ſcarce at all, or very perfunctorily been handled. The *drachma* as *nummus*, vvas a ſilver coin in uſe amongſt the *Athenians*, (for I intend only to ſpeak of the *drachma Attica*, for the ſame reaſon that *Pliny* doth, *Ferè enim Atticâ obſervatione utuntur medici*) and ſo it vvas the meaſure of things vendible, as all coins are: and as *pondus*, ſo was it the meaſure of their gravity, & weight. Now the *drachma*, as *nummus*, paſſed in the eſtimation of the beſt Authors, both Greek and Latine, at the ſame rate, and valuation as the *denarius* did. And therefore, as often as the Latines are to expreſſe the Greek *drachma*, they render it by the *denarius*, and on the contrary, the Greeks the *denari-*

[f] *Plinius l.33. ca.34.*

[g] *Iul. Poll. l.9. c.6.*

[h] *Plinius l.33. ca.34.*

us by the *drachma*. Thus vvhat [i] *Tully* renders by the *denarius*, *Dio* in his 45th book expreſſeth by the *drachma*. Their words, both ſpeaking of *Auguſtus*, are theſe, *Veteranos quique Caſilini, & Calatiæ ſunt* (as *Tully* relates) *perduxit ad ſuam ſententiam, nec mirum, quingenos denarios dat.* Καὶ ἔδωκαν ἑνὸς τότε, ſaith [k] *Dio*, καὶ πεντακοσίας δραχμάς. In like manner [l] *Pliny* writes, *veniſſe murem ducentis nummis*, (that is, *denariis*; for *nummus* abſolutely put is often, though not alwaies, taken for the *denarius*, as on the contrary the *denarius* is taken for *nummus* in *Heſychius*, * δηνάριον τὸ νόμισμα, ἢ εἶδος ἀργυρίου.) *Caſilinum obſidente Annibale, eúmque qui vendiderat fame interiſſe, emptorem vixiſſe annales tradunt.* The ſame thing [m] *Valerius Maximus* reports in his 7th book, and 6th *ch.* and [n] *Strabo* in his 5th book; the former writing that it was ſold for 200 *denarii*, and the later that it vvas bought for 200 *drachmæ*. To theſe Authorities I ſhall adjoin [o] *Cleopatra*. Τὸ Ἰταλικὸν δηνάριον ἔχει δραχμὴν ά. *The Italian denarius containeth one drachma*: and [p] *A. Gellius*, *Lais μυείας δραχμὰς ἑπτακοσίας popoſcit, hoc facit nummi noſtratis, denarium decem millia.*

[i] *Cicer. ep. l. 5. ep. ad Attic.*

[k] *Dio lib. 45.*
[l] *Plinius lib. 8. cap. 57.*

Heſychius in voce δηναρεῖον.

[m] *Valer: Max: lib. 6. cap. 6.*
[n] *Strabo li. 5. Geogr:*

[o] *Fragmenta Cleopatræ*
[p] *A. Gellius l. 18. c. 8. Noct. Att.*

Theſe two thus paſſing the one for the other, being alſo at the firſt inſtitution much of the ſame fineneſſe in reſpect of ſilver, it muſt neceſſarily be admitted, either that they were exactly the ſame for weight, vvhich is our next inquiry, or elſe that they vvere not much different. For in comparing of forain coins, the κολλυβισταὶ, or *nummularii*, in ancient times, muſt have taken the ſame courſe, which our moſt knowing bankers

kers doe practiſe now. Firſt, to reſpect the pureneſſe, and fineneſſe of the coins, whither they be alike *for the intrinſeck*; and next, whither they have the ſame weight; and if they differ in either, or both of theſe, according to thoſe differences to proportion their exchanges. Thoſe other accidentall cauſes of the riſing, and falling, of exchanges of monies, ſince they are meerly contingent, depending upon the neceſſities, either of times, or places, or perſons, I purpoſely pretermit, as not ſo proper, and eſſentiall to our inquiry. As *for the extrinſeck of coins*, by which I mean the outward form, or character, and inſcription of the Prince, or State, though this may raiſe the valuation of them in thoſe Countries, which are ſubject to the Prince, or State, and leſſen them in thoſe which are out of their dominions; yet this can produce no remarkable difference, more then what is uſually aſſigned by the Maſters of the Mint, for the waſt in coining, and for the labour of the vvork.

With theſe cautions if we ſhall examine the Attick *drachma*, and by ſuch writings of the Ancients, or by ſuch coins as are extant, inquire their true weight, we ſhall come to ſuch a preciſeneſſe, as may be hoped for in a work of this nature. [p] *Suidas* tels us in the generall, Δραχμὴ ἡ ὁλκὴ νομίσματος ἀργυρέου. *The drachma is the weight of the ſilver money.* And [q] *Heſychius* more particularly informs us. Δραχμὴ τὸ ὄγδοον τῆς ὀγγίας, *The drachma is the eighth part of the ounce*: and [r] *Fannius* yet more diſtinctly writes,

[p] *Suidas in voce* Δραχμὴ.

[q] *Heſychius in voce* Δραχμή.

[r] *Rhemn. Fann.*

In scrupulis ternis drachmam, quo pondere doctis
Argenti facilis signatur pondus Athenis.

[f] *Fragmenta Cleopatræ.*

To which vve may adde [f] *Cleopatra*, Ἡ δραχμὴ ἔχει γράμματα γ'. ὀβολοὺς ς'. θερμοὺς θ'. κεράτια ιή. χαλκοὺς μή. *The drachme hath three scruples, sixe oboli, nine lupini, eighteen siliquæ, forty eight areola.* The [t] *Scholiast of Nicander* also makes the δίδραχμον to be τὸ τέταρτον τῆς οὐγγίας, *the fourth part of the [Attick] ounce.* In the same proportion are we to take those other silver Athenian coins mentioned by [u] *Julius Pollux*, namely, the τρίδραχμον, which consisted of three drachmes, the τετράδραχμον, or τέτραχμον, which by a Syncope, is the same with the τετράδραχμον, containing foure drachmes, or the half ounce. Τέτραχμον, τετράδραχμον, saith [y] *Hesychius*; though [z] *Ammonius* puts a distinction between them, τέτραχμον μὲν γὰρ ὅτι τὸ νόμισμα, τετράδραχμον δὲ τῶν τεσσάρων δραχμῶν [ἄξιον]. This the Greeks also called στατὴρ, as [a] *Cleopatra*, and [b] *Epiphanius* witnesse. Ὁ στατὴρ, in *Cleopatra*, ἄγει ∠ δ'. καλοῦσι δὲ αὐτὸν τετράδραχμον: *the stater weighs four drachmes, this they call the tetradrachme.* And this also may most cleerly be collected out of [c] S. *Matthew*, where seeing the originall expresseth it more fully then our translation, I shall recite the vvords as they are in the Greek. Ἐλθόντων δὲ αὐτῶν εἰς Καπερναοὺμ, προσῆλθον οἱ τὰ δίδραχμα λαμβάνοντες τῷ Πέτρῳ, καὶ εἶπον, ὁ διδάσκαλος ὑμῶν οὐ τελεῖ τὰ δίδραχμα; which the Vulgar renders thus, *Et cum venissent Capernaum, accesserunt, qui didrachma accipiebant, ad Petrum, & dixerunt ei, Magister vester non solvit didrachma?* and our Translation thus; *And*

[t] *Scholiastes Nicandri.*

[u] *Iul. Poll. l. 9. c. 6.*

[y] *Hesychius in voce* τέτραχμα.

[z] *Ammonius* περὶ ὁμοίων καὶ διαφόρων λέξεων.

[a] *Fragmenta Cleopatræ.*

[b] *Epiphanius* περὶ σταθμῶν.

[c] *Matth. ca. 17. v. 24.*

when

when they were come to Capernaum, they that received tribute money, came to Peter, *and said, Doth not your Master pay tribute?* In the 27th verse of the same chapter, our Saviour answers. Ἵνα μὴ σκανδαλίζωμεν αὐτοὺς, πορευθεὶς εἰς τὴν θάλασσαν βάλε ἄγκιστρον, καὶ τὸν ἀναβαίνοντα πρῶτον ἰχθῦν ἆρον, καὶ ἀνοίξας τὸ στόμα αὐτοῦ, εὑρήσεις στατῆρα. ἐκεῖνον λαβὼν δὸς αὐτοῖς ἀντὶ ἐμοῦ καὶ σοῦ. *Nothwithstanding, lest we should offend them, goe thou to the sea, and cast an hook, and take up the fish that first cometh up: and when thou hast opened his mouth, thou shalt find a peece of money: that take, and give unto them for me, and thee.* This, which our Translation cals *tribute mony*, in the 24th ver. is called in the original δίδραχμον, or *two drachmes*, & so much was paid by the pole, according to [d] *Josephus*, for each particular person. Our Saviour therefore paying for himself and S. *Peter*, in the 27th verse, bids him to give a *stater*, that is, a τετράδραχμον, or four drachmes, namely, the double to the δίδραχμον, *which our Translatiō renders too generally by a peece of mony:* But the [e] *Persian* Translation interprets it distinctly by four drachmes. جهار درم درو بيابي انرا بياور عوض من و عوض تو بده *Thou shalt finde four drachmes in it, that take, and give for thee, and me.*

[d] *Iosephus li. 7. bell. Iud. ca. 27*

[e] *Evangelia Pers. MSS. Eruditissimi Viri D. Pocockii.*

With this Attick *tetradrachme*, or silver *stater*, the *Hebrew*, and *Samaritane* שקל *shekell*, that is, *sicle*, did also agree. For if we give credit to *Iosephus*, who in [f] *Scaligers* esteem is, *Diligentissimus* καὶ φιλαληθέστατος *omnium scriptorū*, we shal finde them to be the same. [g] Ὁ δὲ σίκλος νόμισμα ἑβραίων

[f] *Scal. προλεγομ. in libr. de Emend. Temp.*

[g] *Iosephus l. 3. antiq. Iudaic.*

ἕβραιον δὲ ἀργύριον δίκλωτον τετραδράχμους τινὰς ἔχειν. *The ſicle is a ſort of mony amongſt the Hebrews, that contains four Attick drachmes.* The ſame proportion is evidently collected out of [h] *Philo*, where for L. ſhekels mentioned in the Law he renders CC. drachmes, and for XXX. an hundred and twenty. [i] *Heſychius* likewiſe teſtifies as much, σίκλος τετράδραχμον Ἀττικὸν, *the ſicle is* [in valuation] *the Attick tetradrachme:* and [k] S. *Hierome*, the ableſt of the Fathers in the Jewiſh Antiquities, * *Siclus, id eſt ſtater, habet quatuor drachmas Atticas.*

Philo de decalogo.

[i] *Heſychius in voce σίκλος.*

[k] *Hieronym. in Ezek. 3.*

* Such ſicles, I conceive, were thoſe τριακοντα ἀργύρια, *the* XXX *peeces of ſilver*, which were given to *Iudas*, as the reward of his treaſon. *Euſebius* relating the ſtory expreſly, terms them *ſilver ſtaters*, which an Hebrew would have termed either ſilver ſhekels, or abſolutely כסף *ceſef:* this in the Scripture phraſe being frequently put for the ſhekel, and therefore the Syriack Tranſlation of the New Teſtament reads it סלעין; Whence *Tremellius* hath this annotation. *Obſervant Hebræi, ubicunque in Scripturis argenteorum ſit mentio, non expreſſâ numiſmatis argentei ſpecie, intelligi ſiclum ſanctuarii æquivalentem quatuor denariis.* Some modern Writers imagine them to have been but XXX. *denarii*; But *Baronius* contends that they were, *vel librarum argenti* XXX, *vel aureorum coronatorum trecentorum:* And *Arias Montanus*, that they were either XXX *libræ*, or XXX. *talenta*. The moſt probable opinion is, that this ſum was neither ſo great as *Baronius*, and *Montanus* make it, nor yet ſo little as ſome Moderns would have it, but between both, and that is XXX. ſhekels. M. *Caſaubone* in his Exercitations upon *Baronius* hath a probable conjecture to ſtrengthen this aſſertion. *Non enim temere factum videtur, quòd filius Dei qui ſeſe exinanivit, aſſumptâ ſervi formâ*, Phil. 2. 7. *triginta argenteis venderetur, ſicut lege Dei mancipia totidem ſiclis æſtimantur.* Exod. 21. 32. *& apud Ioſephum lib.* IV. *c.* VIII. *Facit hoc quoque non parum ad Domini abjectionem declarandam, quando caput ejus tam parvi æſtimatum eſt.* A ſmall price I confeſſe, XXX. ſhekels being leſſe then XV. of our ordinary crowns: But *Hierome* upon Saint *Matthew* thought it to bee as little, who thus writes, as M. *Caſaubone* renders him, *Inſe licem Iudam non cogitaſſe quanti pretii rem venderet. ſed Chriſtum mundi Salvatorem, Dei filium, ceu vile aliquod mancipium minimo pretio addixiſſe.* Now the price of a ſervant we finde in *Exodus* to have been XXX. ſhekels.

Theſe

Theſe teſtimonies are ſo poſitive, and from ſo good Authors (to which alſo I might adjoin [l] *Epiphanius* in his book περὶ σταθμῶν, did I not conceive him to be full of errours in that diſcourſe), that I cannot ſufficiently wonder at that ſtrange opinion of [m] *Groſepſius*, and ſome others, introduced out of affectation of novelty, of a double ſhekel, the one ſacred, equall to the tetradrachme, the other prophane, weighing the didrachme: that uſed in the Sanctuary, this in civill commerce, without any ſolid foundation in the writ, or without any probability of reaſon, that in any wiſe State, the Prince and people ſhould have one ſort of coin, and the Prieſts ſhould have another: and that this of the Sanctuary ſhould be in a double proportion to the other, and yet that both ſhould concur in the ſame name. It is true there is often mention in the [n] Scriptures of the *weights of the Sanctuary*, not as if theſe were different from what were uſed vulgarly in the City; but becauſe the Standards, and originals, the rules of commutative juſtice, and therefore of an high and ſacred uſe, were kept (as it is more then probable) in the Sanctuary; For God himſelf makes this one of the Prieſts offices, [o] *ut ſint ſuper omne pondus atq; menſurã*. And it is no wonder that God, who ſo much hated a [p] *falſe balance*, and a *falſe meaſure*, ſhould commit the charge of theſe to the Prieſts, as things moſt holy; ſince the Heathens themſelves out of a reverent eſtimation of them, placed them in their temples, as appears by that inſcription of the *congius* of *Veſpaſian* before alleaged, and now extant

[l] *Epiphanius περὶ σταθμῶν.*

[m] *Groſepſius de multiplici ſicło, & talento.*

[n] And all thy eſtimation ſhall bee according to the ſhekel of the Sanctuary. *Levit.* 27. 25. *Vet. vulg. ſicla Sanctuarii ponderabitur.*

[o] 1 *Paral.* 23. 29

[p] *Prov.* 11. 1. *item cap.* 20. *ver.* 10. 23.

tant in *Rome*; and by theſe verſes of [q] *Fannius*, treating of the Romane meaſures,

Amphora fit cubus, quam, ne violare liceret,
Sacravere Iovi Tarpeio in monte Quirites.

And afterwards in the times of Chriſtianity they were kept in Churches, as it is to be ſeen in the [r] *Authenticks of Juſtinian*; where he commands, that the weights and meaſures ſhould be kept, *in ſacratiſſimâ cujuſvis civitatis eccleſiâ*, As for thoſe allegations taken out of the intepretation of the LXX. whereby *Grſepſius*, and others goe about to prove a double ſhekell, they are all well, and ſolidly, in my judgement, anſwered by [s] *Villalpandus*, and others, to whom I ſhall refer the judicious Reader. For I intend not here to ſpeak of the Hebrew ſhekel, or Attick drachme, more then what may ſerve to illuſtrate the *denarius*.

Seeing therefore, as we have proved, that the Attick *drachma* was equall in the notion, and acception of the Ancients, to the *denarius*: if therefore an intire, either Attick δραχμὴ, or δίδραχμον, or τετράδραχμον were found, wee might thence conclude the *denarius*. Again, ſince the Hebrew ſhekel hath likewiſe been demonſtrated to be equall to the Attick τετράδραχμον, and this Attick τετράδραχμον to four *denarii*, by the common, and received * axiome of Geometricians, we may conclude, that the Hebrew ſhekell was alſo equall to 4 *denarii*, that is, that 4 Romane *denaxii*, the Attick τετράδραχμον, and the Hebrew שקל were all reſpectively equall to one another. If therefore an Hebrew ſhekel, fair, & intire, were found, we might as neceſſarily thence

[q] *Rhemn: Fann. carmina de pond. & menſuris.*

[r] *Authentic. collat. 9. de collatoribus tit. 11. novel. 128. c. 15*

[s] *Villalp. de appar. urbis ac templi par. 2. lib. 1 diſp. 4. c. 28. Item par. 2. li. 2. diſp. 4.*

* *Quæ eidem æqualia, ſunt æqualia inter ſe. Eucl. ax. 1. l. 1.*

thence infer the *denarius*, as by the τετράδραχμον.

We shall indevour by both these to inquire out the truth, and first by the Attick tetradrachmes in silver: because of these I have seen, and weighed many, some of them very fair, and perfect, and found at many severall places, as *Athens*, *Constantinople*, *Tenedos*, and other parts: where the art of counterfaiting coins is not as yet crept in, and where it is to litle purpose to practise it: seeing in those places there are few so curious as to buy them, or that will give a greater valuation, then what they are worth in the *intrinseck*. Wherefore having in *Italy*, and elsewhere, perused many 100 *denarii Consulares*, I finde by a frequent, and exact triall, the best of them to amount to LXII. grains English, such as I have carefully taken from the Standards of the Troy, or silver weights, kept in the Tower in *London*, and in Goldsmiths Hall, & in the Vniversity of *Oxford*: on the other side weighing many Attick *tetradrachmes*, with the image of *Pallas* on the fore part, and of the *noctua* on the reverse. I find the best of these to be CCL XVIII. grains, that is, each particular drachme LXVII. grains.

And that no man may doubt whither these were true *Athenian tetradrachmes*, we are to observe, that the Ancients used severall impresses on their coins, by which they might be known, and distinguished. And therefore *argentum signatum*, in the description of *Quintius* his triumph over *Philip*, is by [t] *Livy* opposed to *argentum infectum*, which [u] *Pollux* terms ἄσημον, as [x] *Tully* cals the former sort *factum*, *atque signatum*, and the [y] Greeks ἐντετυπωμένον. Thus the

[t] *Livius l.34.*
[u] *Iul Poll. l.9. c.6.*
[x] *Cicer. 6. Verr.*
[y] *Iul. Poll. l.9. c.6.*

the *denarius* had the impreſſe of the *biga*, or *quadriga*, as *Pliny* informs us: and therefore [z] *Livy* uſes the word *bigati* for *denarii*, & [a] *Pliny* both *bigati* and *quadrigati*. The braſſe coins of the Romanes were thus marked.* *Nota æris fuit ex altera parte Ianus geminus, ex altera rostrum navis, in triente vero & quadrante rates.* The *Perſians* ſtamped on the reverſe an [b] archer: vvhich occaſioned that conceit of *Ageſilaus*, mentioned by * *Plutarch*, *that the King of Perſia had beaten him back with ten thouſand archers*, when with ſo much mony he had corrupted the Grecians. The *Carthaginians* on the one ſide ſigned the face of a woman, (I ſuppoſe in memory of Queen *Dido*) on the reverſe the head of an horſe, or in *Virgils'* expreſſion * *caput acris equi*, both vvhich I have ſeen. The *Peloponneſians* had the impreſſe of a tortoiſe on their mony, whence that witty Greek proverb took its originall. [c] Τὰν ἀρετὰν, ἢ τὰν Ζοφίαν νικᾶντι χελῶναι. The mony at *Tenedos* had on the one ſide a double hatchet, and on the other ſide two heads, one of a man, and another of a woman, ariſing from the ſame ſtemme, or neck, in memory of a Law made by the King of that Iſland (whom * *Heraclides* names Τέννης, placing him ancienter then the *Trojan* war), that a man, and a woman, taken in adultery ſhould have their heads ſtruck off vvith an hatchet. In which kind I met with two very rare, and ancient coins in ſilver, at *Conſtantinople*, both made vvith a very fair relevy, and both agreeing in the ſame image, and inſcription: the one weighed leſſe then the Attick *tetradrachme*, the other wanted ſomewhat of the *drachme*. And becauſe

[z] *Liv. l. 34.*
[a] *Plinius l. 33. ca. 3.*
* *Plin. ib.*
[b] *Plutarchus in Artaxerxe.* Τὸ δὲ Περσικὸν νόμισμα τοξότην ὑπόσημον ἔσχεν.
* *Plut. Ageſil.*
* *Virg. l. Æneid.*
[c] *Iul. Poll. l. 9. c. 6.*
* *Heraclides* περὶ πολιτειῶν.

becauſe the coin hath not, I think, been ſeen by any Antiquary, and the hiſtory is remarkable, I ſhal here expreſs the figure of the faireſt of theſe.

And the hiſtory I ſhall relate out of [d] *Heraclide*. Νόμον δέ τινά φασι βασιλέα Τέννην διαθέσθαι, εἴ τις λάβοι μοιχὸν ἀποκτείνειν τοῦτον πελέκει. ἁλόντος δὲ τοῦ υἱοῦ αὐτοῦ, καὶ τοῦ λαβόντος ἐρομένου βασιλέα τί χρὴ ποιεῖν, ἀποκρίνασθαι τῷ νόμῳ χρῆσθαι. καὶ διὰ τοῦτο τοῦ νομίσματος αὐτοῦ ὅθεν θάτερα πέλεκυς κεχάραχται, ὅθεν δὲ θάτερα ἓξ ἑνὸς αὐχένος πρόσωπον ἀνδρὸς καὶ γυναικός. καὶ ἐκ τούτου λέγεσθαι ὅσα τις ἀποτόμως, τὸ ἀποκεκόφθαι Τενεδίῳ πελέκει. *They ſay King* Tennes *made a law, that if one took another in adultery, he ſhould kill him with an hatchet. His ſonne being found ſo, and he that took him, asking the King what he ſhould do, he anſwered execute the Law: and for this reaſon of one ſide of his money there was an hatchet imprinted, on the other the face of a man, and of a woman, ariſing out of one neck. From hence is it ſaid of ſevere actions, to be cut with a Tenedian hatchet.* For which exemplary juſtice thoſe of *Tenedos*, as it is probable, deified King *Tenes*. [e] *Tully* writes, *Tenedii Tenem* [*Deum appellant*]: and again, [f] *Tenem apud Tenedios putant eſſe ſanctiſſimum deum.*

[d] Heraclides de politeiais.

[e] Cicer. libr. 3. de natura deorum.

ctissimũ Deum, ac eorũ Vrbem condidisse. Where his name is truer writ thẽ in *Heraclides.* For the coin hath onely a single N. and so hath * *Eustathius.*

Eustathii παρεκβολαὶ εἰς τὴν ἀ ῥαψῳδ. Ιλιαδ.

The *mony of Chios*, as *Iulius Pollux* witnesses, had the *effigies*, or resemblance, of *Homer*: no doubt in honour of his memory; though [g] *Herodotus* relates, that whilst he vvas living he found at first but cold entertainment in that Island. *Theseus* the tenth King of the *Athenians* signed his mony with the impresse of an oxe; hence that proverb βοῦς ὀπὶ γλώσσῃ βέβηκεν. This as [h] *Iulius Pollux* testifies was the δίδραχμον: vvho farther adds, τὸ δὲ παλαιὸν τοῦτο ἦν Ἀθηναίοις νόμισμα, καὶ ἐκαλεῖτο βοῦς ὅτι βοῦν εἶχεν ἐντετυπωμένον. εἰδέναι δὲ αὐτὸ καὶ Ὅμηρον νομίζουσιν εἰπόντα, ἑκατόμβοι' ἐννεαβοίων. καὶ μὲν κἂν τοῖς Δράκοντος νόμοις ἔστιν ἀποτίνειν δεκάβοιον, καὶ ἐν τῇ παρὰ Δηλίας θεωρίᾳ τὴν κήρυκα κηρύττειν φασὶν ὁπότε δωρεάν τινι ἐδίδοτο, ὅτι δοθήσονται αὐτῷ τοσοῦτοι βόες, καὶ δίδοσθαι καθ' ἕκαστον βοῦν δύο δραχμὰς ἀττικάς. *This was an ancient coin amongst the Athenians, and was called* βοῦς, *because it had the figure of an oxe instamped. They imagine that Homer knew this, when he said, nine hecatombes of oxen, and also in the laws of Draco, it is to pay the mulct of ten oxen. And they say, that at the solemn shew at Delos, the crier when any gift is to be given, cries so many oxen shall be given, and for every oxe so many Attick didrachmes are given.* The same [i] Author writes, that the *Attick tetradrachme* was stamped vvith the face of *Minerva*, and he might have added with the *noctua* on the reverse. This * *Eubûlus* pleasantly cals παλλάδος πῶλον *Minervæ pullum.* The Διώβολον had the face

[g] *Herodot. in vita Homeri.*

[h] *Iul. Poll. l. 9. c. 6.*

[i] *Iul. Poll. ibid.*

* *In Anthise.*

face of *Iupiter*, it may be it is an error in *Pollux*, for *Pallas*, and on the other side the *noctua*. The τριώβολον had on the one side *Iupiter*, according to * *Pollux*, (I conceive it to be a mistake for *Pallas*, or *Minerva*) on the other side two *noctuæ*, because it was the double to the διώβολον. From the *diobolū*, [k] *Plautus* uses the term *diobolaris Servorū Sordidulorum, Scorta diobolaria*, which [l] *Festus* interprets thus, *meretrices diobolares appellatas, ex eo quòd duobus obolis ducerentur.* To which I may adjoin, out of such ancient coins as I have seen, that the *triobolum* (whence that phrase of [m] *Plautus, homo trioboli*, and of the Greeks ἄξιος τριωβόλου) which by [n] *Pollux* is called the ἡμίδραχμον, had the face of *Pallas* on the one side, and the *noctua* on the other; and so likewise had the *obolus*, and *drachma*, of such as I perused, and all of them on the reverse the inscription ΑΘΕ. And I think I may safely add, that on such coins as we finde the *noctua*, with a deep relevy, we may conclude them to be *Athenian* coins. [o] *Plutarch* is of the same opinion in the life of *Lysander*, where he discourses of *Gylippus* a Commander, as famous for defeating the *Athenians* in *Sicily*, as infamous for stealing the silver consigned to him by *Lysander*, for the city Sparta. *When he arrived*, saith Plutarch, *at Sparta, he hid the silver that he had stoln under the tiles of his house, and delivered into the hands of the Ephori the bags, shewing them the seals* [intire]: *Which being opened, and the money told, they found the sums to disagree from the labels: wherewith being troubled the servant of Gylippus in obscure tearms intimated to them, That under the tiles of his Masters*

* *Iul. Poll. l. 9. c. 6.*

[k] *Plautus in Pœnulo.*

[l] *Sextus Pompeius Festus de Verb. signif.*

[m] *Plautus in Pœnulo.*

[n] *Iul. Poll. l. 9. c. 6*

[o] *Plutarchus in Lysandro.*

house there were hid many noctuæ, or owles; ἦν γὰρ (ὡς ἔοικε) τὸ χάραγμα τοῦ πλείστου τότε νομίσματος, διὰ τοὺς Ἀθηναίους γλαῦκας. *For the greatest part (as it seems) of the money then had the stamp of the noctua, by reason of the Athenians:* who not long before, as *Thucydides*, and the best Historians of those times shew, were the richest, and most flourishing State amongst the Grecians.

Having therefore had the opportunity to have bought, or else the favour to have weighed many fair, and perfect Attick tetradrachmes, found at remote places, with the *Pallas galeata* on the one side, and the *noctua*, vvith the inscription ΑΘΕ on the reverse, where Ε being placed for Η proves the antiquity of them. (For the Atticks at the first used not Η, but onely Ε for both Ε and Η) I finde by the best of these (to reassume what I said before) that the Attick tetradrachme is 268 grains, and the drachme 67 of our Troy, or English standard. Which may farther be confirmed by an Attick drachme of mine own, found in the *Black Sea*, vvith this inscription, ΑΘΕ ΤΙΝΑΡΝΙΚΑ ΑΡΧΕ, and by a * τριώβολον, or semidrachme bought by me at *Alexandria*: that weighing neer 66 grains, and this 30 and better: the face of *Minerva*, either by use, or time being a litle diminished in both: but yet so litle, that they cannot have lost above two or three grains of their primitive vveight. And as this single Attick drachme of mine is much to be valued by Antiquaries for the vveight, and therefore vvas desired by the learned *Peireskius*: so is the inscription

* I have since perused a fair Athenian τριώβολον of my very worthy, and learned friend, *Iohn Marsham* Esquire, weighing completely 33 grains English. As also another of Sir *Tho. Roes*, together with an ὀβολὸς of his, weighing 11 grains.

Ti-

TINAPNIKA APXE no leſſe vvorth conſideration, for the explication of a place in [p] *Livy*: who deſcribing the naval triumph of *L. Æmilius*, vvrites thus, *Pecunia tranſlata nequaquam tanta pro ſpecie regii triumphi. Tetracina Attica* CCXXXIII. *millia, Ciſtophori* CCCXXII. *mil.* Where [q] *Budæus*, and *Rhodiginus* in ſtead of *tetracina*, read *tetradrachma. Tetracinum enim quid ſit, nemo ut arbitror novit*, ſaith *Budæus*: I vvould rather read it, as the coin doth, *Tinarnica*: this having almoſt the ſame letters vvith *Tetracina*, vvhich by the Scribes, I ſuppoſe, have been inverted. Neither is there any reaſon, why *Livy* might not as vvell mention in this triumph, *Attica Tinarnica*, as *Tetradrachma*; theſe being the fourth part of the tetradrachme, and therefore better agreeing with his deſcription: *Pecunia tranſlata nequaquam tanta pro ſpecie regii triumphi*: and alſo better agreeing vvith the *Ciſtophori* he here mentions: a ſort of coin about half of theſe *Attica Tinarnica*, whereas the *tetradrachma* were eight times as great. For [r] *Feſtus* expreſſing the *talentum Euboicum*, renders it by 7500 *ciſtophori*, and by 4000 *denarii*, or Attick drachmes, that is, CIↃ. tetradrachmes. *Euboicum talentum nummo Græco ſeptem millium & quingentorum ciſtophorûm eſt: noſtro quatuor millium denariorum.*

[p] *Livius l.37.*

[q] *Bud. lib.2. de aſſe. Rhodigin: lect. antiq. l.10 c.2.*

[r] *Sextus Pompeius Feſtus de Verb: ſignif.*

And as theſe teſtimonies above alleaged are beyond all exceptions, ſo the *gold coins of the Grecians*, which I have examined, doe moſt evidently prove this proportion aſſigned to the Attick [s] drachme. Which that vvee may the better underſtand, vve are to obſerve vvhat pro-

[s] drachme.

portion the valuation of the gold of thoſe times had to the ſilver; and next, vvhat proportion it had in reſpect of weight.

[f] *Iul Poll l.9. c.3.*

For the firſt, [f] *Iulius Pollux* in very perſpicuous tearms, puts it down, Τὸ δὲ χρυσίον ὅτι τοῦ ἀργυρίου δεκαπλάσιον ἦν σαφῶς ἄν τις ἐκ τῆς Μενάνδρου παραγραφῆς μάθοι. *That the gold was in a tenfold proportion to the ſilver one may evidently learn out of* Menanders' *paracatathece.* [t] The *Scholiaſt* of *Ariſtophanes* implies as much. Εἰσὶ μὲν χρυσοῦς στατῆρες οἱ Δαρεικοί. ἐδύνατο δὲ ἕκαστος αὐτῶν, ὅπερ ἐστὶ παρὰ τοῖς Ἀττικοῖς ὀνομαζόμενον χρυσοῦς, οὐκ ἀπὸ Δαρείου τοῦ Ξέρξου πατρὸς ἀλλ' ἀπ' ἄλλου τινὸς παλαιοτέρου βασιλέως ὠνομάσθησαν. Λέγουσι δέ τινες δύνασθαι τὸν Δαρεικὸν δραχμὰς ἀργυρίου εἴκοσιν. ὡς τοὺς πέντε Δαρεικοὺς δύνασθαι μνᾶν ἀργυρίου. *The Darics are golden ſtaters, each of them is worth as much as that which is named by the Attickes the* χρυσοῦς. *They are called ſo not from Darius the Father of Xerxes, but from another King more ancient then hee. Some ſay that the Darick is valued at* XX. *drachmes of ſilver, ſo that* V. *Darics are worth a mina of ſilver.* For the Attick μνᾶ, or *mina*, containing an hundred drachmes in weight, as it is very cleer out of [u] *Pliny*, * *Pollux*, and others. *Mna* (ſaith *Pliny*) *quam noſtri minam vocant, pendet drachmas Atticas centum.* And *Pollux*, Ἡ μνᾶ ἡ παρ' Ἀθηναίοις ἑκατὸν εἶχεν δραχμὰς Ἀττικάς: *The mina with the Athenians containeth an hundred Attick drachmes*, and the χρυσοῦς Δαρεικὸς, or στατὴρ χρυσοῦς of *Darius*, conſiſting of two drachmes in weight, as vve ſhall preſently prove, it vvill neceſſarily follow that the proportion of the δραχμὴ χρυσῆ, was

[t] *Scholiaſtes Ariſtophanis.*

[u] *Plinius l.21. c.34.*

* *Iul Poll l.9. c.3.*

to

to the δραχμὴ ἀργυρίου, *in decuplâ ratione*: and therefore that five Daricks, or ten drachmes of gold, were equall in valuation to an hundred drachmes in silver, that is, to the μνᾶ. The same proportion may be collected out of [y] *Polybius*, vvhen the Romanes upon a summe of mony to be received, concluded a peace with the *Aetolians*. Ἀντὶ τρίτου μέρους τοῦ ἀργυρίου χρυσίου, χρυσοῦν ἐὰν βούλωνται διδόντες τὴν δίκην μνῶν ἀργυρίου, χρυσίου μνᾶν Which words [z] *Livy* renders thus. *Pro argento si aurum dare mallent, dare convenit, dum pro argenteis decem aureus unus valeret.* This being granted, as certainly of necessity it must, I would correct that place of [a] *Hesychius* concerning the δραχμὴ χρυσίου, and read it thus, Δεκαχμὴ ἢ χρυσίου ἀλλὰ νομίσματος τῆς ἀργυρᾶς λόγον δεκαχμῶν ι'. & not διδραχμων ι'. as it is in the printed copies. And by this of *Hesychius* I would supply the defect of [b] *Suidas*, who writes. Δεκαχμὴ ἢ ἀλλὰ νομίσματος τῆς ἀργυρᾶς δραχμὰς ι'. and make it thus, Δραχμὴ ἢ χρυσίου ἀλλὰ νομίσματος τῆς ἀργυρᾶς λόγον δραχμὰς ι'. For without the addition of χρυσίου, and λόγον, there is no sense: And I beleeve *Suidas* took these very words out of *Hesychius*.

Having thus found the proportion that the δραχμὴ χρυσίου had to the silver, our next inquiry is, how many of these drachmes in weight the χρυσοῦς, or χρυσοῦς στατὴρ, or *aureus* contained. [c] *Iulius Pollux* gives us in this particular the best, and most positive information of any, ὁ δὲ χρυσοῦς στατὴρ δύο ἔχει δραχμὰς Ἀττικάς. *The golden stater* [or aureus] *contains two Attick drachmes.* The same is confirmed by [d] *Hesychius*: Πολλαμαρχος φησὶ δύνασθαι τὸ χρυσοῦν παρὰ τοῖς Ἀττικοῖς

[y] *Polybii* ἱκλεγαὶ περὶ πρεσβειῶν *ca.* 28 *Ex bibliotheca Fulvii Vrsini. Antv.* 1582.

[z] *Livius l.* 38. παρὰ δὲ τοῖς Ἑλλήσιν κ' δραχμῶν τὸ χρυσοῦν ἀλλάττεται νόμισμα. *Zonaras.*

[a] *Hesychius in voce* δραχμή.

[b] *Suidas in voce* δραχμή.

[c] *Iul. Pollux libr.* 4. *c.* 24.

[d] *Hesychius in voce* χρυσοῦς.

δραχμὰς δύο· τὴν δὲ τοῦ χρυσοῦ δραχμὴν νομίσματος ἀργυρίου, δραχμὰς δέκα. *Polemarchus saies that the aureus amongst the Athenians contains two drachmes, and that the drachme of gold is worth ten drachmes of silver.* And to this of *Pollux* and *Hesychius* all the *aurei* of the ancient Grecians, which have passed through my hands, doe very well correspond. Now these *aurei* as they had severall impresses upon them, so had they severall names, by which they are distinguished. For they were either Ἀττικοὶ, or Δαρεικοὶ, or Φιλίππειοι, or Ἀλεξάνδρειοι, or the like, all which we may prove by *Xenophon*, * *Harpocratio*, the *Scholiast of Aristophanes*, and others, to have been equall unto two Attick drachmes, and therefore respectively equall to one another. Neither is this much to be wondred at, that the Grecians, and Persians, though at enmity amongst themselves, yet should agree in the *aurei*; seeing that in our times, the Venetian Chequeen, the Barbary Ducat, the Ægyptian, and Turkish Sherif, are almost all of the same purenesse in respect of the gold, and not differing above a grain in the weight. Which difference we may also allow to those of the Ancients, without any prejudice to our inquiry. Concerning these *aurei*, or golden staters, the observation of [c] *Iulius Pollux* is worth our consideration, Καὶ οἱ μὲν Δαρεικοὶ ἐκαλοῦντο στατῆρες, οἱ δὲ Φιλίππειοι, οἱ δὲ Ἀλεξάνδρειοι, χρυσοῖ πάντες ὄντες, καὶ εἰ μὴ χρυσοῦς εἴποις προσακούεται ὁ στατὴρ, εἰ δὲ στατὴρ εἴποις οὐ πάντως ὁ χρυσοῦς. *Of the staters some were denominated from* Darius, *some from* Philip, *some frō* Alexander *& were al of gold. And when you say the*

* Λέγουσι δέ τινες δύνασθαι τὸν Δαρεικὸν ἀργυροῦς δραχμὰς κ (as *Ios. Scaliger* rightly corrects the printed copies, which render it ἡ or ὀκτὼ) ὡς τοὺς πέντε Δαρεικοὺς δύνασθαι μνᾶν ἀργυρίου. *Harpocr.* Τρισχίλιοι Δαρεικοὶ *Xenophonti sunt* δέκα τάλαντα. *Talentum autem* 600 *drachmæ. Ergo* Δαρεικὸς *sunt* 20. *drachmæ. Scal. de re num.*

[c] *Iul Poll. l.* 9. *c.* 6.

the aureus, the ſtater is underſtood, but if you ſay the ſtater, the aureus is not always meant. And this is moſt true; for the χρυσῦς, or *aureus* (I ſpeak not here of the *aureus Romanus*, this being ſomewhat leſſe then theſe mentioned by *Pollux*) did alwaies imply the στατὴρ, but the στατὴρ did not alwaies infer the *aureus*: the *ſtater* being more generall, ſignifying as well the *argenteus*, as the *aureus*, and that was double to this; the *ſtater argenteus* being four drachmes, as we proved before, and therefore the ſame with the tetradrachme, & the *aureus* two drachmes, and therefore equall in weight to the didrachme. Wherefore every *aureus* was rightly called a *ſtater*, but every *ſtater* could not rightly be called an *aureus*.

From theſe *aurei* then, or χρυσοῖ στατῆρες, vve may deduce the ſilver Attick drachme, if we either had the Δαρεικοὶ, ſome of which to this day are found in *Perſia*, or if we had the Φιλίππειοι, or the Ἀλεξάνδρειοι. To paſſe by the Δαρεικοὶ, becauſe I have not peruſed any of them, and to ſpeak onely of the Φιλίππειοι and Ἀλεξάνδρειοι, of which there are many extant.

Concerning the Φιλίππειοι * *Snellius* writes thus. *Philippi nummum unicum, & Alexandri Macedonum, ſolertiſſimus veterum nummorum æſtimator Nicolaus Rockoxius poſſidet, utrumque eodem ponere granorum* 179. Now CLXXIX. grains of gold in *Holland*, ſuch as *Snellius* uſed, are anſwerable to an hundred thirty four grains Engliſh and an half. Neer vvhich proportion I have obſerved two others, with the inſcription ΦΙΛΙΠΠΟΥ, excepting onely a grain, or two.

* *Snellius de re nummaria.*

As for the Ἀλεξάνδρειοὶ, I finde the weight of

one of the fairest for impression, and character, I think in the world, which I bought at *Alexādria*, with the image, and inscription ΑΛΕΞΑΝΔΡΟΥ, to be exactly of English grains 133 $\frac{1}{2}$, and another at *Constantinople* 133, and in the same proportion severall others. With which comparing one of mine honoured and learned friend *Iohn Marshā* Esquire, I find his a grain defective: And weighing since some others out of that choice, & rare κειμήλιον of ancient coins collected by the noble Sir *Simonds D' Ewes*, Knight Baronet, I observed two of his to exceed 133 by $\frac{1}{2}$ a grain.

Wherefore I may conclude (allowing onely half a grain for so much wanting by time, or by the mint) from the *aureus* being double to the Attick drachme, that it hath been rightly assigned by me to be $\overline{\text{LXVII}}$. grains; And from this with those limitations above mentioned I may conclude the *denarius Consularis*, (which is our principall inquiry) seeing *Galen li.8.c.3. de compositione Medicam:* according to the Latine manner of division), speaking of an antidote prescribed by *Asclepiades*, whereof the *dosis* was to be one drachme, or *denarius*, writes thus. Ἡγοῦμαι δὲ λέγειν αὐτὸν δραχμὴν ἀργυρᾶν, καὶ γὰρ οὕτω σχεδὸν ἅπασι τοῖς νεωτέροις ἰατροῖς ἔθος ὀνομάζειν. ἄλλο δὲ νοεῖν ἡμᾶς οὐδὲν ἡ τοῦ πράγματος φύσις ἀναγκάζει. πρόδηλον δ' ὅτι δραχμὴν λέγομεν νῦν ἐν τοῖς τοιούτοις ἅπαντες, ὅπερ Ῥωμαῖοι δηνάριον ὀνομάζουσιν. *I suppose, that he means the silver drachme, for so all the later Physicians are wont to call it, neither will the nature of the thing suffer us to understand any other. And it is manifest that in such things as we all now name the drachme,*

[f] *Galenus l.8. de composit. medicam.*

the

the Romanes name the Denarius.

The *denarius* alſo, as we proved before out of *Philo*, *Ioſephus*, Saint *Hierome*, and *Heſychius*, may be inferred by the Hebrew, or Samaritane ſhekel: the ſhekel, by the joint teſtimony of all of them, being equall in valuation to the Attick *ſtater argenteus*, or *tetradrachme*, and the Attick tetradrachme, as we have ſhewed, to 4 *denarii Conſulares*: if therefore an Hebrew, or Samaritane ſhekel in ſilver, fair, and not impaired, were found, we might by this as well diſcover the *denarius*, as by the *tetradrachme*, or the *aureus*. And here I muſt confeſſe I have not ſeen ſo many perfect, and entire, with the Samaritane characters, vvhich certainly are the beſt, and trueſt, (For thoſe with the later characters, invented, as ſome ſuppoſe, by *Eſdras*, are moſt of them counterfait) as to give my ſelf ſatisfaction. For though I have peruſed that of *Arias Montanus*, now in the Univerſity of *Oxford*, which he deſcribes in his tract *de Siclo*, and from whence he deduces the proportion of the Hebrew ſhekel, yet to ſpeak the truth, there is no truſt to be given to it: Not but that the coin is very ancient, and the inſcription upon it in Samaritane characters well made; but the ſides of it have been ſo filed away, that it hath very much loſt of the true weight. For I finde it to be ſcarce the weight of twenty pence of our Engliſh Standard. Whereas *Montanus*, if he made his obſervation exactly, equals it to almoſt four Spaniſh rials, or to four Romane *Iulios*: both which exceed two of our Engliſh ſhillings. So that till ſuch time as I may procure out

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of the East, (whither I have often sent) some perfect shekels, I must be content to take up the relations of others. And here I shall begin with *Moses Nehemani Gerundensis* a Jew, a learned expositor of the Pentateuch, who as *Arias Montanus* tels us, flourished in *Catalonia* above 400 years since. His words, as *Montanus* hath delivered them in his tract *de Siclo*, are these. g *In comment. Exod.* 39. *multis verbis differens significabat se non facile ad Salomonis Iarrhæi, qui ante illum in Galliâ scripserat, sententiam de siclo accedere; cum Salomon affirmasset, Siclum esse dimidiam argenti unciam. Postea jam absoluto in omnem Legem Commentariorum opere, idem Moses Gerundensis capite ad eam rem proprie addito, sicli æstimationem à Salomone illo indicatam, re ipsâ doctus, ingenuè, & apertè, ut viros doctos, & veri inveniendi, atque docendi cupidos decet, comprobavit. Narrat autem se eo anno, quo illa scriberet, in Palæstinam ex Hispaniâ sacrorum locorum visendi causâ navi delatum Acconam, quam nunc Iachan vocant, devenisse; ibidemque sibi ab incolis ostensum fuisse nummum argenteum antiquissimum, expressis tamen signis & literis conspicuum; in cujus altero latere forma esse vasculi illius, quod mannâ plenum in sacra arca ad sæculorum monumentum, Dei jussu, & Mosis procuratione fuerat repositum: & in altero ramus ille admirabilis, quem in fasciculum virgularum plurimarum Aaronis nomine illatum (cum illius sacerdotali dignitati ab æmulis quibusdam obtrectaretur) posterâ die populus omnis florentem, amygdaláque explicantem vidit; inscriptiones etiam fuisse in eodem nummo Samaritanis characteribus*

g *Arias Montanus de siclo. in libro qui inscribitur Thubal Kain, sive de mensuris.*

bus

bus, quæ olim communes totius Israelis litera fuerant, ante discessionem decem tribuum à duabus, lingua planè Hebraica, quarum exemplum ex alterâ parte erat SEKEL ISRAEL, quod Latinè sonat Siclus Israelis: ex alterâ verò IERVSALEM KEDESSAH, hoc est Ieruſalem ſancta: qui nummus antiquitatem cùm primis magnam probabat, utpote cuius nomine Israelis, eo tempore quo omnes XII. tribus communi concordia Israelis nomen obtinebant; quóque Hieroſolyma ipſis omnibus regia urbs, ſanctaque erat; eademque communis omnibus & religionis, & publicæ rei & moneta, atque literarum ratio, quæ poſtea diſceſſione factâ, alia atque alia utrique parti fuit. Namque Iudæi, ut omnes ferè ſcriptores aſſerunt, ne cum Schiſmaticis Israelitis ullo Sacrorum uſu communicarent, eam Literarum formam, quæ nunc etiam in uſu eſt, hoc eſt quadratam, mutatis valde alterius prioris figuris, adinvenêre. Affirmat præterea idem Gerundenſis, nummum illum, qui Siclus inſcribebatur, ſibi in ſtaterâ penſum dimidia argenti uncia pondus reddidiſſe, oſtenſam quoque alteram monetam dimidiato pondere minorem, iiſdem omnino vaſis & rami figuris quæ tamen non SEKEL, ſed HHASZI SEKEL, hoc eſt dimidius Siclus diceretur. probari itaque ſibi vel maximè Salomonis Iarchai, de ſicli pondere, & valore, ſententiam. Thus far *Gerundenſis*: who if he had expreſſed with what half ounce he compared his ſhekel, or if *Montanus* had done it for him, they had given the judicious Reader better ſatisfaction. But this I ſuppoſe, by a a probable conjecture, may be ſupplyed, in ſaying that he living in *Catalo-*

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nia weighed it with the *Catalonian*, or *Spaniſh* half ounce; which [h] *Villalpandus*, and [i] *Ciaconius*, both of them *Spaniards*, make equall to the half ounce now uſed at *Rome*, that is, to two ſhillings three pence farthing, *q.* of our mony. This conjecture of mine will exceeding well confirm thoſe many obſervations of *Villalpandus*, a man in this kinde very curious, which he made of ſeverall ancient ſhekels in ſilver, who thus writes. [k] *Igitur ante aliquot annos appendimus Siclum unum apud F. Vrſinum, & poſtmodum eos omnes, quos præcedenti capite percenſuimus, atque comperimus ſingulos argenti ſiclos ex æquo ſemuncia Romanæ antiquæ reſpondere; ita ut ne minimum quidem hordei aut frumenti granulum, huic, vel illi lanci addi potuerit, quin in eam examen propenderet. Nec mirum cuiquam videri debet, antiquiſſimos nummos ſuo priſtino ponderi nunc reſpondere, neque ullam argenti partem vetuſtate conſumptam tot ſæculis fuiſſe. Nam ſingulari Dei beneficio nobis contigit, tot integros appendere potuiſſe ſiclos. Id quod nummi ipſi integri vetuſtatem maximè præ ſe ferentes, literæ expreſſæ, extantéſque, argenti color, atque alia id genus multa, facile probant.* With theſe obſervations of *Villalpandus* I finde the weight of a very fair Samaritane ſhekel of *the truly noble, and learned M. Selden* to agree: to whom I ſtand obliged for this favour, as he doth for the coin *to the honourable Antiquary Sir Robert Cotton*. To theſe teſtimonies, though (it may be) ſufficient of themſelves, I ſhall add * one more, for farther illuſtration of the weight of the Hebrew, or Samaritane ſhekel, and that is

[h] *Eadem omnino ſunt unciæ, quibus olim Romani, Hiſpaniique utuntur. &c. Villalp. de appar. Vrb. ac Templi par. 2. l. 3. c. 20.*

[i] *Ciaconius de ponderibus pag. 45.*

[k] *Villalpand. de app. Vrbis ac Templi par. 2. l. 2. diſp. 1. c. 28.*

* We may alſo inſert the obſervation of *Anton. Auguſt. dialogo 2. Ne ho uno [ſiclo] che è d' argento, & è di peſo di quattro dramme conforme à quello che dice San Girolamo ſopra Ezechiellc:* where by four drams he means half the Romane ounce.

is of an ancient, and fair one, in silver, amongst his Majesties coins, perused by *the most reverend Primate of Ireland, a man of exquisite learning, and judgement*, who hath often assured me that it weighs two shillings five pence of the English standard; which proportion excepting some few grains, in which it doth exceed, does well correspond with those of *Villalpandus*. And this may farther be confirmed out of the Talmud [l] כל כסף האמורה בתורה כסף צורי ושל דברי הם כסף מדינה *Argentum omne cujus in Lege fit mentio, intelligitur argentum Tyrium* (*ponderis & bonitatis ut in urbe Tyri*: as [m] *Schlinder* interprets it) *sed Rabbinorum argentũ intelligitur argentum commune provinciale*. Taking therefore the *silver mony of* Judea, as the Talmud doth, to be equall to the *Tyrian*, and that of *Carthage* to be equall to that of *Tyre*: as it is very probable, that the *Carthaginians*, being a plantation of the *Tyrians*, might observe their proportions in coins, as vvell as their customes, in religion, we may by these discover the shekel to be much about the same weight that hath been assigned. For [n] *Ant. Augustinus*, describing in his dialogues the weight of two fair *Carthaginian* coins in silver, writes, *that they are each of them somewhat more then four drachmes*, that is, as he elsewhere explains himself, a litle more then half the Romane ounce. If therefore we shall adhere to the observation of *Gerundensis*, made four hundred years since, or to these later of *Villalpandus*, and others; or to this conjecture of mine, the Hebrew shekel, and half the present Romane ounce, are either both the

[l] *Kiddushf.* 11.

[m] *Schindlerus in pentaglotta.*

[n] *Ant. August. dialog.* 6.

the ſame, or elſe very neer in proportion.

And this may eaſily be granted; but if it be, how vvill 4 *denarii Conſulares*, 4 Attick drachmes, and the Hebrew ſhekel, be reciprocally equall one to another, as they ſhould be by thoſe ſeverall teſtimonies before alleaged? Whereas by many hundred *denarii Conſulares*, tried by an exact balance, I finde the beſt of theſe to contain LXII. grains Engliſh, and the Attick drachme LXVII. And the fourth part of the ſhekel to be but LIV. grains ½, if we admit of *Gerundenſis*, and *Villalpandus'* obſervations. Which notwithſtanding according to *Philo*, *Ioſephus*, Saint *Hierome*, *Epiphanius*, and *Heſychius*, ſhould be equall to the Attick drachme, and the Attick drachme by the teſtimonies of the ancients ſhould be likewiſe equall to the *denarius*. For the ſolution of this objection I anſwer. Firſt, that the *denarius*, and *Attick drachme*, being diſtinct coins of different States, and not much unequall in the true vveight, it is no wonder, eſpecially in *Italy*, and in the Romane dominions, that they ſhould paſſe one for another: no more then that the *Spaniſh rials* in our Sea Towns in *England*, ſhould paſſe for *teſtars*, or the quarters of the dolar be exchanged for our ſhillings: whereas the riall in the intrinſecall valuation is better then our teſtar by four grains, and ſomewhat more, and the quarter of the dolar is better then our ſhilling by more then 8 grains, or a penny; but becauſe they want the valuation, character, and impreſſion of our Princes, vvhich I call the *extrinſeck of coins*, therefore doth the *Spaniſh* mony fall from

from its true value with us, and ſo would ours doe in *Spain*. By the ſame analogy muſt vve conceive the *Attick drachmes*, though in the intrinſeck they were ſomewhat better worth then the *denarius*, yet for want of the extrinſeck, to have loſt in *Italy*, and thereby to have become equall in valuation to the *denarius*. And this ſeems to be implied by ° *Voluſius Metianus*. *Victoriatus enim nunc tantundem valet, quantum quinarius olim. At peregrinus nummus loco mercis, ut nunc tetradrachmum, & drachma, habebatur.* Which words of his *loco mercis*, plainly ſhew they made ſome gain of the *tetradrachmum*, and *drachma*: as our Merchants, and Goldſmiths doe of the *Spaniſh* rials, and quarters of a dolar: Which they could not doe, if they were preciſely equall, but muſt rather be loſers in the melting, or new coining of them. And therefore all ᵖ modern Writers that have treated of this argument, ſome of them making the *drachma* leſſe then the *denarius*, others equall, but none greater, have been deceived by a double paralogiſme, in ſtanding too nicely upon the bare words of the Ancients, without carefully examining the things themſelves. Firſt, in making the *denarius*, and *Attick drachme* preciſely equall, becauſe all ancient Authors generally expreſſe the Attick *drachme* by the *denarius*, or the *denarius* by the *drachme*; either

° *Vol. Metianus de aſſis diſtributione.* Theſe words of *Metianus* I finde in a *MS.* of *Temporarius* thus corrected. *Victoriatus enim nunc tantundem valet, quantum quinarius Olim ut peregrinus nummus loco mercis, ut nunc tetradrachmū, & drachma habebatur.* Whither it be by conjecture, or that he found it in ſome ancient *MS.* I know not, but the emendation I cannot but approve.

ᵖ *Budæus drachmam putat ejuſdem ponderis eſſe cum denario, Onuphrius verò inter utrumque ſtatuit rationem ſeſquitertiam, Agricola ſeſquiſeptimam, ut Pannonii tres denarii quatuor drachmas, Agricolæ verò ſeptem denarii octo drachmas efficiant. Capel. de pond. & nummis l. 1. LXXXIV. denarii, quæ eſt Libra Romana, ſunt æquales XCVI. drachmis, quæ eſt libra Italica, & medica. Scal. de re nummariâ.*

becauſe

becauſe in ordinary commerce, and in vulgar eſtimation they paſſed one for another, in the Romane ſtate; or elſe if any were ſo curious to obſerve their difference, as ſurely the κολλυβισταὶ were, yet by reaſon of their neerneſſe, and to avoid fractions, and having no other names of coins that were preciſely equall, whereby to render them, therefore all Greek, and Latine Authours, mutually uſed one for the other. And ſecondly, becauſe ſome Writers, as *Dioſcorides* and *Cleopatra* affirm, that the Romane ounce contained eight drachmes, therefore modern Authors infer, that the *denarius* being equall to the drachme, and eight drachmes being in the Romane ounce (as ſo many were in the Attick) that therefore there are eight *denarii* in the Romane, and conſequently that the Romane, and Attick ounces are equall. Whereas *Celſus*, *Scribonius Largus*, and *Pliny*, as we ſhewed before, expreſly write, that the Romane ounce contained in their time, which was after *Dioſcorides*, ſeven *denarii*. And being naturall Romanes, and purpoſely mentioning the proportion of the *denarius* to the ounce, thereby the better to regulate their *doſes* in phyſick, it is not probable, but they muſt better have known it then the Grecians. Beſides, who with any certainty can collect out of theſe imperfect fragments of *Dioſcorides*, and *Cleopatra* (for thoſe tracts of theirs *de ponderibus* are no better) whither at the firſt they wrote in that manner, as they are now printed? Or if they did, why might not they indevour to introduce into the Romane ounce, in imitation of the Attick,

tick, that manner of diviſion, which is now generally received in our times, of making the ounce, of vvhat kinde ſoever it be, to contain eight drachmes. And ſurely this of eight being *a compound number*, as Arithmeticians uſe to ſpeak, was much fitter then ſeven, uſed by the Romanes, which being *a prime number*, is therefore incapable of any other diviſion. And then for to conclude, that becauſe the Attick ounce had eight drachmes, and the Romane as many, that therefore their ounces are equall: is all one as to conclude, that the Paris, and Engliſh ounces are equall, becauſe the French as well as we (and ſo doe all Phyſicians of all Countries that I know) divide their ounce by eight drachmes. And thus, I ſuppoſe, I have ſufficiently anſwered the firſt part of the objection, concerning the *Denarius*, and the Attick drachme: that if we reſpect the vulgar and popular eſtimation, in which ſenſe claſſicall Authours underſtood them (For they could not wel otherwiſe render them, then as they were currant) ſo were they equall; but if we reſpect the intrinſecall valuation, which depends upon the weight, eſpecially when coins are of a like fineneſſe, ſo were they unequall: the Attick drachme being of our mony eight pence farthing *q*, and the *denarius Conſularis* ſeven pence half penny farthing: allowing for the ſtandard * VIII. Engliſh grains to the ſilver penny.

* Theſe proportions, with thoſe before, & thoſe which follow, are taken from the Engliſh ſtandard at five ſhillings the ounce (as it was formerly coined) to avoid fractions: that is, eight grains to the ſilver penny: whereas in theſe times it is five ſhillings two pence. Not that the ounce is increaſed, for this is alwaies conſtant and fixt, but that for reaſons of State, our ſilver coins are diminiſhed, and conſequently contain fewer grains. And this diminution muſt neceſſarily be, as often as other Nations, with whom we have commerce, rebate in the proportions of their coins; or elſe we muſt be content to be loſers.

Neither do I know any authority, that either expreſly, or by a true, & logical conſequence, can be produced out of Claſſical Authors to infringe this aſſertion of mine, unleſſe it be one in *Fannius*, which being a fragment is the leſſe to be valued: and another in *Livy*, who thus writes, *lib.* 34. in his deſcription of the triumph of *Quinctius*. *Signati argenti octoginta quatuor millia fuere Atticorum, tetradrachmum vocant; trium ferè denariorum in ſingulis argenti eſt pondus.* Which words of his occaſioned [p] *Georgius Agricola*, not knowing how to anſwer them, to bring in a diſtinction of three ſorts of *denarii*: the *Gravis*, weighing an Attick drachme, and an half, the *Mediocris*, one & a ſeventh part, the *Levis*, moſt cómonly one; without any cleer proof, or evidence in any ancient Author, and directly contrary to all ancient coins of the Atticks, and Romanes, which I have ſeen: of which errour he would not have been guilty (For there is no man that hath writ either *de ponderibus, & menſuris*, or *de re metallicâ*, more ſolidly, and judiciouſly then he) if he had been ſo happy as to have peruſed many intire Grecian *aurei*, & *tetradrachmes*, or elſe to have examined a greater, and more ſelect quantity of Romane coins. To ſatisfie my ſelf concerning that place of *Livy*, I had recourſe to our *MSS.* here (and I could wiſh I had done the like in *Italy*) and theſe I finde to agree with the printed copies; though the coins, which are much ancienter then any *MSS.* conſtantly diſagree. Wherefore if it be not a miſtake in *Livy* himſelf, which I am not apt to beleeve in ſo grave an Authour, I would correct

[p] *G Agricolæ reſponſio ad Alciatum de pond. & menſuris. Argentei Romanorum denarii triplices ſunt: graves, qui pendunt drachmam Atticam cum dimidia: mediocres, qui drachmam & ſeptimam ejus partem: leves, qui plerunque drachmam.*

correct the copies by the coins, and instead of III. *ferè denariorum*, make it thus, IV. *ferè denariorum*. Where the figure V, being resolved into two lines, and left a litle open at the bottome, might easily be taken by the scribe for the figure II. And this I doe certainly * beleeve is the true ground of that errour, wherewith so many of late have been perplext. However it were, it is as ancient as *Priscian*, or *Pseudo-Priscian* (as *Capellus* styles him) who, in his tract *de ponderibus*, reads those words of *Livy* in the same manner, *trium ferè denariorum*.

As for the *denarius aureus*, a name I think not known to the Ancients, which *Salmasius* and others collect out of [q] *Livy*, *de fœdere Æ-tolico*. *Pro argento si aurum dare mallent, dare convenit, dum pro argenteis decem aureus unus valeret.* I see no solid foundation for that opinion; all that can be collected thence is, that the gold then was *in decuplâ ratione* to the silver, which I have proved before. And whereas [r] *Plautus* hath his *denaria Philippea*.

Nummi octingenti aurei in marsupio infuerũt,
Præterea centum denaria Philippea.

this is a metaphorical, or comical expression of him, and no certain sort of coin: which he pleasantly cals *denarii*, because half the χρυσοῦ φιλίππιοι were equall in weight to the *drachma*, and so also was the Romane *denarius* supposed to be.

Nor are we to take the λεπτὸν, which is thrice mentioned by Saint *Matthew*, and once by Saint *Mark*, for the *denarius*, as some have done: no, nor for any other sort of coin. For it is pre-

* If this answer be not satisfactory, we may say, as some have done, that *Livy*, *Fannius*, and the Scholiast of *Nicander*, speak of the *denarii* of the former Consuls immediately succeeding *Q. Fabius*, For there being but six of those in the ounce, (as they suppose) the *denarius* will bee greater then the *drachma*, as it will be lesse when seven were coined, under the later Consuls, which is our assertion.

[q] *Livius l* 38.

[r] *Plautus in Rudente.*

ciſely the Latine word *cenſus*, that is, ὁ φόρος, *tributũ*, and ſo is it rendred by Saint *Luke*, Ἔξεστι Καίσαρι φόρον δοῦναι, ἢ οὔ; vvhere Saint *Matthew*, and Saint *Mark* have it. Ἔξεστι δοῦναι κῆνσον Καίσαρι ἢ οὔ; Though *Heſychius*, and *Moſcopulus*, both upon an errour, interpret it a ſort of coin. *Heſychius*, Κῆνσος εἶδος νομίσματος ὀπισθάλαιον, or νομίσματος ὀπισθαλαίου, as M. *Caſaubone* corrects it: and *Moſcopulus*, Κῆνσος νόμισμα δραχμῆς ἰσοστάσιον, *the cenſus is a coin equall in* vveight *to the drachme*, that is, in the notion of the Greeks equall to the *denarius*. The errour of theſe two Greek Grammarians, is a miſunderſtanding the propriety of the Latine word *cenſus*: and that occaſioned them to take κῆνσος, and νόμισμα τῦ κήνσου, for the ſame. But the Evangeliſt *Matthew* puts a manifeſt difference between κῆνσος *tributum*, and νόμισμα, the mony that was paid for tribute. Ἐπιδείξατέ μοι τὸ νόμισμα τῦ κήνσου, writes Saint *Matthew*, *ſhevv me the mony of the tribute*: or as our new Tranſlation renders it, *Shevv me the tribute mony*. And the three Evangeliſts, *Matthew*, *Mark*, and *Luke*, immediately after expreſly tearm this mony the δηνάριον. Οἱ δὲ προσήνεγκαν αὐτῷ δηνάριον, *And they brought unto him a penny*. Which being a Roman coin, and currant amongſt the Jews, being then in ſubjection to the Romanes, it is more then probable that they paid their tribute to *Cæſar*, in the ſame ſpecies of mony that was uſed by *Cæſar*: and not with any new, or peculiar ſort of coin, according to *Baronius* (which M. *Caſaubone* hath juſtly confuted) but with the ordinary currant mony of *Rome*, and that was the *denarius*.

Our

Our next ſolution ſhould be of the *ſhekel*, how it could be equall to the *tetradrachme*, and conſequently to 4 *denarii*, when by the conſtant weight of the beſt Hebrew, or Samaritane ſhekels, extant, wee finde them to bee much leſſe. And here I am a little unſatisfied, how to reconcile the coins to *Philo*, *Ioſephus*, *Epiphanius*, Saint *Hierome*, and *Heſychius*: or elſe, if we admit of the coins (as I know no juſt exceptions againſt them) how to excuſe theſe Autl.ours of too ſupine negligence in comparing them, if ſo be they ever vvere ſo curious as to collate them vvith the Attick tetradrachmes. For if vve ſhall ſay that the ſilver *ſtater*, or Attick tetradrachme, vvas a forain coin, in reſpect of the Rep. of the Jews, and therefore that in *Judæa* it might ſomewhat fall from its true valuation, vve ſhall ſay no more then what reaſon, and experience confirm. But then that the tetradrachme ſhould ſink ſo low, as to looſe four pence half penny, if vve take *the reverend Primates'* obſervation before mentioned, or vvhich is more ſix pence *q.* if vve follow that of *Gerundenſis*, and *Villalpandus*, or *thoſe of mine*, upon two ſhillings nine pence half penny, for ſo much vvas the tetradrachme of our mony, it may ſeem too great a diminution: eſpecially the Attick mony being as pure, and fine, as that of the ſhekel: and therefore no Goldſmith amongſt the Jews, but vvould have given a greater rate onely to melt it, and turn it into bullion. Yet on the other ſide, vvhen I conſider the practiſe of the mony-changers amongſt the Iews at this day, vvhich it may be

vvās as bad in *Philos'*, & *Iosephus'* time, & might occasion our Saviour not long before to vvhip them out of the Temple, *which they by their extortions had made a den of theeves*, who now make it a trade at *Alexandria*, and elsewhere, in changing Spanish dolars into * *madines* (or the small silver mony currant in Ægypt) to gain one or two *madines* upon every dolar, notwithstanding the Spanish mony is as frequent, and as vvell known in *Turky*, as their own. I can the better imagine they might make the same advantage, or a litle more, upon the Attick tetradrachmes: vvhich it may be also vvere not permitted, being contrary to their law, to passe so generally vvith them, as the Spanish mony now doth (by reason of the image of *Pallas*, and the *noctua* instamped:) or if they vvere permitted, yet they might not be so common, and so vvell known: and therefore upon strangers in *Iudea*, in giving them currant mony, for that vvhich vvas forain, they vvould gain so much the more. So that *Philo*, and *Iosephus*, vvhen they equall the shekel to the tetradrachme, may have taken it upon the relation, and practise of these mony-changers, and not upon any experiment of their owne. The same answer may serve for *Epiphanius*, Saint *Hierome*, and *Hesychius*: though it may be these bortowed their descriptions from *Philo*, or *Iosephus*, vvho long preceded them: and being Jews, and living in the time vvhen the State of the Iews vvas in being, vvhereas these did not, their authority is the more to be credited. And thus have vve finished our inquiry of the

* At my being in *Ægypt* thirty five *madines* passed for a dolar: *Sands* in his travails writes forty.

denarius

denarius Consularis, by comparing it vvith the Attick drachmes, and the Hebrew shekels.

The last, and best vvay to discover the true vveight of it, is by the *Congius Romanus*, whereof by a speciall providence, as [a] *Patus*, and *Villalpandus*, have vvell observed, the originall standard of *Vespasian* is still extant in *Rome*. This, as the superscription upon it X P demonstrates, contains the vveight of ten Romane pounds, and is equall (by the joint confession of all Authors treating this argument) to six *sextarii*. Again, the *sextarius*, as * *Galen* vvrites, ἔχει μίαν λίτραν καὶ ἡμίσειαν καὶ ἕκτον, ὡς εἶναι τὰς πάσας οὐγγίας κ'. *contains one pound and an half, and a sixth part, so that it hath in all twenty ounces.* Or as [b] *Oribasius*, Physician to *Iulian* the Apostate, informs us, is equall to the Romane pound, and eight ounces. Ιταλικὸν κεράμιον ἔχει ξέστας μή. ξήστης λίτραν μίαν, καὶ οὐγγίας ή. *The Italian Amphora contains forty eight sextarii, and the sextarius one pound and eight ounces.* The capacity therefore of this *Congius* being filled up vvith sixe *sextarii*, of some certain sort of liquors (For it is *liquorum mensura*) vvill give us ten Romane pounds, and consequently their ounces, and *denarii*. The onely difficulty is, with what sort of liquor we must measure it: for all liquors are not of the same gravity. And this is well cleered by [c] *Rhemnius Fannius*, and others.

Illud præterea tecum cohibere memento,
Finitum pondus varios servare liquores.
Nam Libræ, ut memorant, bessẽ sextarius addet,
Seu puros pendas latices, seu dona Lyæi.

[a] *Patus l. 3. de antiq. liquid. arid. que mens. Villalp. de appar. Vrbis ac Templi par. 2. l. 3. c. 25.*

* *Galen l. 1. de compos. medicam.*

[b] *Oribasius l. 2. ad Eustathium filium.*

[c] *Rhemn: Fann: carmina de pond. & mens.*

The *sextarius*, saith *Fannius*, contains one pound and eight ounces, whither vve weigh cleer water, or vvine: where by wine, according to [d] *Agricola*, is to be understood, *vinum fulvũ*, such as the Greeks call κιῤῥὸν; rather I imagine that wine, which *Galen* cals λευκὸν, καὶ ὀλιγόφορον. The *sextarius* then being one pound eight ounces of cleer water, or pure wine, and sixe *sextarii* being in the *Congius*, it is most evident that the *Congius* contains ten pounds of vvater, or of wine. This also appears by a *Plebiscitum* of the two *Silii*, *Publius*, and *Marius*, which is to be seen in the best copies of [e] *Sextus Pompeius*.

[d] *Agricola l 3. de ponder. rerũ.*

[e] *Sextus Pomp. de verb signif.*

[f] *Fragmenta Dioscoridis.*

VTI. QVADRANTAL. VINI. OCTOGINTA. PONDO. SIET
CONGIVS. VINI. DECEM. IS. SIET
SEX. SEXTARII. CONGIVS. SIET. VINI
DVO. DE. QVINQVAGINTA. SEXTARII. QVADRANTAL. SIET. VINI
SEXTARIVS. ÆQVVS. ÆQVO. CVM. LIBRARIO. SIET

The same is confirmed by [f] *Dioscorides*: who, for farther certainty, mentions with what sort of vvater vve should measure it: and that is with rain * water, which he makes to be the most infallible of all. ὁ χοῦς τουτέστι τὸ κόγγιον ἔχει λι. ι. τὸ ἡμικόγγιον ἔχει λι. ε. ὁ ξέστης ἔχει λίτραν μίαν γο ν, &c. ὁ αὐτὸς δὲ σταθμός ἐστι καὶ ὕδατος καὶ ὄξους. φασὶ δὲ τοῦ ὀμβρίου ὕδατος πληρωθῆναι ἀψευδέστατον εἶναι τὸν σταθμὸν, ἄγεινδὲ ὁλκὰς ψκ τὸν κοῦν. *The Chus, (that is, the Congius) contains ten pounds, the semicongius five, the sextarius one pound, and eight ounces, &c. The weight of water, and of Vinegar is the same. They say that if it be filled up with rain water, the weight will be most certain.*

* The proportion that rain water hath to fountain water, is as 10 0000 to 1007522, & the proportion that it hath to water distilled, is as 1000000 to 997065, as it hath been observed by *Snellius in Eratosth. Bat l 2 c. 5. Est in æquali mole ratio aquæ pluviæ ad distillatam, quẽadmodum* 1000000 *ad* 997065. *pluviæ autem ad putealem ut* 1000000 *ad* 1007522.

The

* *The Congius weighs seven hundred and twenty drachmes.* An *Anonymus Greek Author*, falsly reputed to be *Galen* in the edition at *Venice*, confirms the same, [f] Παρὰ δὲ τοῖς Ἰταλοῖς εὑρίσκεται ὁ χοῦς μέτρῳ μὲν ἔχων ξ ϛ, κοτύλας ιβ. σταθμὸν δὲ ὕδατος ὀμβρίου, ὅπερ ἐστὶν ἀψευδέστατον, δραχμὰς ψκ: *Amongst the Romanes is found the Congius, containing in measure six sextarii (that is)* XII *Cotylæ: but in weight, of rain water, which is most infallible,* IↃCCXX *drachmes.* And whereas [g] *Dioscorides* elsewhere writes. Τὸ κόγγιον ἔχει λίτρας θ'. τὸ ἡμικόγγιον λ'. δ' S. ὁ ξέστης ἔχει λ'. ά S. *The Congius hath nine pounds, the semicongius four and an half, the sextarius one and an half*; there is no repugnan-

* This authority of *Dioscorides*, with that other citation following out of an *Anonymus Greek Author*, strongly proves my assertion, that the *drachma Attica* was more ponderous, then the *denarius Consularis*. For there being eighty four of these *denarii* in the Romane pound, as we have elsewhere proved, and ten Romane pounds in the *Congius*, it is most evident there are IↃCCCXL. *denarii* in the whole *Congius*. Again, IↃCCXX. drachmes, by the testimonies of *Dioscorides*, and this *Anonymus* writer, being equall to the *Congius*, and the *Congius* being equall to IↃCCCXL. *denarii*, therefore IↃCCXX. drachmes are equall to IↃCCCXL. *denarii*, and therefore of necessity every particular drachme of these, must be greater then each particular *denarius*. And though, according to my assertion, the *Congius* containeth some few drachmes more then are by them assigned; yet that difference, seeing it might many waies happen, as I afterwards shew in the like experiments of *Villalpandus*, and *Gassendus*, it cannot any way overthrow my conclusion. For the drachmes are still fewer then the *denarii Consulares*, and therefore greater: which was the thing intended to be proved. And this m y farther be confirmed, in that both *Cleopatra*, and this *Anonymus Authour*, make also the ξέστης, or *sextarius* (being the sixth part of the *Congius*) to containe an hundred twenty drachmes of fountain water. Whereby it appears there is no errour committed in the former numbers. ὁ ξέστης μέτρῳ μὲν ἔχει κοτυλὰς β' σταθμῷ δὲ ϛ' ρκ'. The *sextarius*, saith Cleopatra, *contains in measure two cotyls, but in weight an hundred and twenty drachmes.* And the Anonymus writer, [f] ἔχει δὲ ὁ ξέστης σταθμῷ δραχμὰς ρκ'. *The sextarius contains in weight an hundred and twenty drachmes.* [f] *Anonymus Græc.* [g] *Fragmenta Dioscoridis.*

cy between this, and his former assertion. For here he speaks of the *Congius* filled with oil, and before of the same *Congius* filled with water, or wine: and that this should be but nine pounds, whereas the former is ten, is no more repugnant to reason, then it is to nature, that oil should be lighter then water, or wine: which [h] *Ghetaldus*, in his *Archimedes promotus*, hath demonstrated the most accurately of any man, to be in the proportion that 1 is to 1 $\frac{1}{11}$ in respect of water, and as 1 is to 1 $\frac{4}{11}$ in respect of wine: which is almost the same with *Dioscorides*. The not observing this difference of weight, arising from the different gravity of severall liquors, in vessels of one and the same capacity, is that which hath occasioned much incertainty, and confusion, in modern writers. And therefore we shall for farther perspicuity insert that distinction, which is often inculcated by [i] *Galen*, that the Romanes used two sorts of ounces, and pounds: and those were either σταθμικαὶ, or μετρικαὶ, *ponderall*, or *mensurall*: the one had respect solely to the gravity, the other to the *moles*, and gravity conjointly: the former were alwaies certain and fixt, consisting of solid matter: the later were *Vasa* (frequently ἐκ κέρασι) being receptacles, and measures of liquid substances: and therefore the *libræ*, and *unciæ mensurales*, in these vvere greater or lesse, according as the liquor to be measured vvas heavier, or lighter. Whence [k] *Galen* blames Physitians for not expressing this difference. Διὸ γράφειν ἐχρῆν ἐπιμελέστερον ἐν ταῖς φαρμακίτισι βίβλοις τοὺς ἰατροὺς ὁποίας τινὰς κελεύουσι βάλλε-

[h] *Ghetaldus in Archim: promoto.*

[i] *Galenus l 1. & 6. de comp. medicam. secundum genera.*

[k] *Li. 6. de compos. medicam: sec: genera.*

ἆται τὰς ὑγρίας ἢ τὰς λίτρας τῶν ὑγρῶν φαρμάκων, πότερον τὰς μετρικὰς, ἢ τὰς σταθμικὰς. And he gives the reason of it. [l] Αἱ μὲν γὰρ σταθμικαὶ τὸ βάρος κρίνουσι τῶν σωμάτων, αἱ δὲ μετρικαὶ τὸν ὄγκον. *For the ponderall examine the weight of bodies, but the mensural the moles.* But to return to the *Congius*, and by it to our discovery of the *denarius*. The water then must be naturall, either of some fountain, or of rain. For if it be artificiall, such as are made by distillations, whither by a strong reverberation, or by a gentle, in an alembeck, these having somewhat of the property of fire vvill be lighter then the naturall, as [m] *Agricola*, and others observe. I shall produce two observations of the *Congius* vvith fountain vvater, made by two very eminent, and able men, *Villalpandus*, and *Gassendus*, the one at *Rome*, with the Romane weights, from the * originall *Congius* it self, the other at *Aix*, with the *Paris* weights, from a model, or copy of that at *Rome*, procured by *Peireskius*. And here to compare the *denarius Consularis* vvith their observations, it is necessary to have exactly both the Romane and *Paris* weights. The former, with as much accuratenesse, as it was

[l] *Lib. 1. de composit. medicam: secundum genera.*

[m] *Perinde verò ut vinum hoc factitium omni nativo est levius, sic aquæ ferè omnes, quæ ignis calore rebus quibuscunque excoctis destillarint, quas ob id distillatas appellant, cæteris aquis leviores sunt. Agricola l. 3. de pondere rerum.*

* This *Congius* I had weighed, if I could have procured a balance of such exactnesse, as was fitting for such a work. The want of which occasioned *Villalpandus* to suspect the observation of *Pætus*: though *Pætus* writes thus of himself. *Plenum, cùm justissimâ trutinâ, quâ hodie Romæ utimur cùm appendissem* [congium], *inveni aquam, quâ eum compleveram, libras nostri temporis novem, uncias sex semis efficere, quibus uncias quinque, drachmas quatuor, scripulum unum, & grana* XIV. (*quæ amplius sunt in his nostris, quam in antiquis libris computando eum congium libras decem*) *& ultra scripulum unum, & grana* XIV. (*de quibus nullam rationem habendam esse judicavi*) *ex antiquis libris prædictis pendere inveni.* But *Villalpandus* trying it long after *Pætus*, with more care, and with a balance made of purpose, found it to be exactly ten such pounds, as are now used in *Rome*. All that I could doe was to fill the capacity of it with

milium

milium well cleanſed, and to compare it with the Engliſh meaſures taken from the Standards. *It contained of our meaſures for wine three quarts, one pint, and one eighth part of a pint. Of our corn, or dry meaſures, three quarts and about one ſixth part of a pint.* At my being in *Italy*, there was found amongſt the ruines at *Rome* a *Semicongius* in braſſe, of the ſame figure with this of *Veſpaſians*, the ſides much conſumed by ruſt. This I alſo meaſured, and found it to be the half of *Veſpaſians' Congius*. From this meaſure of the *Congius* we may rightly apprehend how vaſt that draught was of *Novellus Torquatus*, who drank three of theſe *Congii* at once: from whence he was called *Novellus Tricongius*. The ſtory is recited by *Pliny* [*l.* 14. *c.* 22.] *Apud nos cognomen etiam Novellus Torquatus Mediolanenſis ad Proconſulatum uſque è prætura honoribus geſtis, tribus congiis (unde & nomen illi fuit) epotis uno impetu, ſpectante miraculi gratiâ Tiberio principe in ſenecta jam ſevero, atque etiam alias ſævo, ſed ipſâ juventâ ad merum promior fuerat.* In the ſame chapter *Pliny* likewiſe diſcourſes thus of *Cicero*, ſonne to that famous Oratour. *Tergilla Ciceronem Marci filium binos congios ſimul haurire ſolitum ipſi objicit, Marcoque Agrippæ à temulento ſcyphum impallium.*

poſſible, were taken in *Rome*. The other were ſent me by *Monſieur Hardy, a learned man of honourable quality in Paris*, who compared them with the Standard. To begin with that of *Villalpandus*, who gives us a large deſcription, with how much caution, and circumſpection, and with how exquiſite a balance he twice made his experiment, whereby he diſcovered the weight of it in water to be exactly anſwerable to ten ſuch pounds, as are now uſed in *Rome*: Whence he concludes, [n] *Conſtanter aſſerimus antiquam Romanorum libram, unciam, ac pondera, tot ætatum ſucceſſione, ac Romani imperii perturbationibus minimè immutata fuiſſe, ſed eadem per manus tradita uſque ad noſtra tempora perduraſſe.* This Romane pound of his reduced to the Engliſh Standard for ſilver, or Troy

[n] *Villalpandus l.* 2. *diſp.* 2. *c.* 18. *de apparatu Vrbis ac Templi.*

Troy vveight, vvith vvhich I have faithfully collated it, is 5256 grains Engliſh, ſuch as the Troy pound is 5760: the whole *Congius* therefore conſiſting of ten pounds, will be 52560 Engliſh grains. The other obſervation is related by ° *Gaſſendus*, in his elegant diſcourſe *de vitâ Peireskii. Vt paucis ergo res dicatur, cantiones adhibuimus eaſdem, quas Lucas Pætus, & Villalpandus, dum vas ipſum, ad ſummum collum puteali aquâ opplevimus, expendimus, vaſis pondus ſubduximus. Deprehendimus autem aquam, quæ Romano pondere eſſe debuit decem librarum, ſeu unciarum centum viginti, eſſe pondere Pariſienſi (qualе nempe Pariſiis exploratum, miſſumque eſt) librarum ſeptem, minus unciæ quadrante: ſeu unciarum centum undecim, & quadrantum unciæ trium. Deinde ex hac proportione collegimus unciam Romanam continere grana quingenta, & triginta ſex, qualium quingenta ſeptuaginta ſex in Pariſienſi continentur: unde & illis in drachmas collectis, obvenere cuilibet drachmæ grana ſexaginta ſeptem: idque proinde cenſuimus pondus denarii Cæſarei, quem dictum eſt fuiſſe* drachmalem.* Now the *Paris* ounce ſent to me by *Mon-*

° *Gaſſendus in vitâ Peireskii.*

* The inference of *Gaſſendus* I eaſily grant, that the *denarius* under ſome of the *Cæſars* was *drachmalis*, that is, the eighth part of the Romane ounce. But neither was it alwaies ſo under the *Cæſars*, nor if it had been ſo, will it therefore follow that it was *drachmalis*, or the eighth part in reſpect of the Attick ounce. Seeing the Athenian ounce was greater then the Romane, as we have before proved; and therefore the *Denarius Conſularis*, which was the ſeventh part of the Romane ounce, was ſcarce the eighth part of the Attick. Where fore he muſt ſee how he can make it good, where he brings *Peireskius* in the ſecond book of his life thus diſcourſing —*Denarium, cùm tempore Regum pependiſſet trientem unciæ, ſub antiquâ tamen Rep. pependiſſe ſolum ſextantem, ſub recentiore partem ſeptimam, ſub primis Cæſaribus octavam, ſeu drachmam (Atticæ nempe drachmæ æqualem.)*

ſieur

ſieur Hardy, containing four hundred ſeventy two grains Engliſh, and an half, and the *Congius*, according to *Gaſſendus*, of the *Paris* ounces 111 $\frac{1}{2}$, the compleat weight of the *Congius* in grains will be 52801 $\frac{7}{8}$. Which ſum exceeds that of *Villalpandus* by 241 $\frac{7}{8}$, that is, by more then half a Romane ounce. This difference (though it is not great) between theſe two obſervations of theirs might ariſe, either from the unequall ſwelling of the water in the *Congius*: or from the different gravity of fountain water at *Rome*, and at *Aix*: or from ſome inequality of the model, and Originall: or from ſome defect in the *jugum*, or beam of the balance, vvhich if it vvere not made by a very skilfull hand, by the preſſure of ſo great a weight, would ſuffer ſome alteration. Which vvay ſoever it vvas, either by ſome, or all of theſe, the difference cannot prejudice my concluſion a compleat grain: vvhich no reaſonable man but will allow, either for coining, or for waſt. For if I divide 52560, the number of the grains in the *Congius*, according to *Villalpandus*, by $\overline{\text{I}}\text{D}\text{CCCXL}$ the number of the *denarii* in ten pounds, the ſum will be $\overline{\text{LXII}}$. $\frac{4}{7}$. Or if we ſhall follow *Gaſſendus*, though I ſhould rather prefer *Villalpandus*, becauſe he took his immediately from the originall, then vvill the weight of the *denarius Conſularis* be $\overline{\text{LXII}}$. $\frac{561}{1120}$. The fraction in both without any inconvenience may be omitted. And this proportion of the weight of the *denarius Conſularis*, if it were neceſſary, I could farther prove by ſome of the *aurei Conſulares*, which often were double in weight to the *denarii*, as the

the χρυσοῖ Ἀττικοὶ were double to the δραχμαὶ ἀργυρεῖαι; as also by severall *quinarii* in silver (which are the half of the *denarii*) by a very ancient, and perfect * *semuncia*, by a *quadrans*, and *triens*, all of them in brasse of mine own, and by severall other weights examined abroad. One of thē I cannot pretermit, being neer five Roman pounds, and very remarkable for this inscription. EX. AUCTORITATE. Q. JUNI. RUSTICI. PR. VR but the weight of it is a little defective; part of the *silex* (as many of the ancient Romane weights, that I have seen, were * *ex silice*, which is as hard, or harder thē marble) being broken away, else the rest is very intire, and well polished. But I conceive that, by those former waies, I have so irrefragably demonstrated the true ponderousnesse of the *denarius Consularis*, that it would be thought superfluous, or a vain ostentation, to endevour any farther to prove it. Wherefore in stead of that I shall handle the *denarius Cæsareus*, which is our second inquiry.

The *denarius Cæsareus*, was that which was made under the government of the *Cæsars*. And this in stead of the face, and inscription *ROMA*, with the character X or ✠ on the fore part, and the impresse of the *biga*, or *quadriga*, on the reverse, (in which kind most of the *denarii Consulares* were stamped) had on the reverse severall impresses, and on the other side the image, or resemblance of the Emperour: which occasioned our Saviour to ask the question, when a δηνάριον, or Romane penny, was shewed to him: *whose is this image, and superscription? They say unto*

* Of these Romane *Semunciæ*, I have bought, and seen severall in brasse. Besides one, which I owe to *my very worthy, and learned friend* Dr *Ent.*

* *Patus l. 1. de antiq. Rom. & Græc. interv. mensuris*, makes mention of a *libra Romana* in brasse procured by *Fulvius Vrsinus*, of singular rarity: *in cujus supremâ planitie argenteis literis hæc erat nota I, & in circumferentiâ hæ aliæ EX. AVC. D. CAES* but this I had not the happinesse to see in *Italy*.

* Matth. 22, 20.

unto him Cæsars'. This *denarius Cæsareus*, if wee respect some definitive quantity, and weight, was as various, and uncertain, as the *denarius Consularis* of the later Consuls was constant, and fixt: being under the first Emperours, sometimes more, sometimes lesse, as the reasons, and exigencies of the State did require, or the profuseneſſe, and prodigality of those times. Yet this uncertainty (as far as I have observed) was limited within some certain, and determinate bounds: the *denarius Cæsareus* never exceeding the seventh part of the Romane ounce, and never being lesse then the eighth part, but often in a middle proportion between both, and that with much inequality. And this made [b] *Villalpandus*, after many experiments at *Rome*, to conclude, that out of the *denarii* nothing concerning the Romane weights could be determined. Though *Portius*, *Agricola*, *Ciaconius*, *Snellius*, and severall others, before, and after him, are of a contrary opinion. And it may be, if *Villalpandus* had distinguished between the difference of times, and in them of the different coins, and considered those of the Consuls, distinctly from those of the *Cæsars*, and those of the former *Cæsars*, from those of the later, he would have reformed his judgment. For it plainly appears, upon examination, that the diminution of their weight was an invention introduced after *Antonius* the Triumvirs' time, whereasbefore the *denarius* was fixt. *Miscuit*, saith [c] Pliny, *denario Triumvir Antonius ferrum, ali è pondere subtrahunt* (his meaning is under the Emperours, to *Vespasians'*, or his own time) *cùm*

[b] *Villalpandus de apparatu Vrbis ac Templi par. 2. l. 2. disp. 2. c. 13.*

[c] *Plin. l. 33. c. 9.*

sit juſtum octoginta quatuor è libris ſignari. Where he ſaies very well in ſpeaking ſo generally, *alii è pondere ſubtrahunt*, without preciſely limiting the proportion. For this, as we obſerved, was very various, and undeterminate: ſo that whereas the juſt number of the *denarii*, according to the practiſe of the later Conſuls, ſhould bee eighty four in the Romane pound, we finde by the weight of the beſt of them under the former *Cæſars*, that they coined ſometimes eighty ſixe, eighty eight, &c. till at laſt there came to be ninety ſix *denarii* in the Romane pound, that is, eight in the ounce. And this, by a very neceſſary conſequence, may be inferred out of another place of *Pliny*, if we take for granted, what ſome learned Moderns confeſſe, and the gold and ſilver coins found to this day, of the later Conſuls, and firſt Emperours, ſtrongly prove, that as the Atticks made their χρυσοῦς, or *aureus*, double in weight to the δραχμὴ ἀργυρᾶ: ſo did the Romanes make their *aureus* double in weight to the *denarius*. Which proportion they might borrow from the *Athenians*, and other *Grecians*, who, as *Arias Montanus* imagines, firſt received it from the practiſe of the *Hebrews*: or rather, as I ſuppoſe, from the *Phenicians*, and theſe from the *Hebrews*. From whenceſoever it came, it is not much materiall in our inquiry: that which we may ſafely conclude from thence is this, that the gold being, in reſpect of weight, double to the ſilver, the *aureus Romanus* falling in its weight, the *denarius* likewiſe of neceſſity muſt fall: elſe could they not have continued *in duplâ ratione*. Now in

[d] *Arias Montanus in* Thubal Cain, *ſive de menſuris.*

what manner the *aureus* was firſt coined, and how afterwards it loſt of its primitive weight, *Pliny* informs us. *Aureus nummus, poſt annum* LXII. *percuſſus eſt, quam argenteus, ita ut ſcrupulum valeret ſeſtertiis vicenis, quod efficit in libras ratione ſeſtertiorum, qui tunc erant, ſeſtertios* IↃCCCC. *Poſt hac placuit* XL.M. *ſignari ex auri libris: paulatimque principes imminuere pondus, imminuiſſe vero ad* XLV.M. For this teſtimony, and the former, we are to thank *Pliny*, ſeeing there is neither Greek, nor Latine Author extant, from his time to *Theodoſius*, that gives us any certainty, what to conclude concerning the ancient coins. And therefore ſince this later is of great conſequence, but ſomewhat corrupted, I compared it with the *MSS.* in the *Vatican*, and *Florentine* Libraries, and with a fair one in *Baliol* College, which renders the later part of it thus. *Poſtea placuit* X.XL. *ſignari ex auri libris, paulatimque principes imminuere pondus, imminuiſſe verò ad* XLVIII, vvhere for XLVIII. [f] *Villalpandus* corrects, or rather corrupts, the text, in writing XLV. But *Agricola*, and [g] *Snellius* read it by conjecture thus. *Poſt hac placuit* XLII. *ſignari ex auri libris, paulatimque principes imminuere pondus, minutiſſimè verò ad* XLVIII. And [h] *Snellius* gives a reaſon of it in his Eratoſthenes Batavus. *Nam ita argentei denarii, & aurei nummi eadem manet analogia, pondere ſubduplo, ut quamdiu octoginta quatuor argentei è libra, & è ſingulis unciis ſeptem cudebantur, tam din quoque aurei duo & quadraginta libram implerent. Poſtquam vero argentei nummi pondus imminutum eſt:*

Plin. l. 3. c. 33.

[f] *Villalp. de apparat. Vibus ac Templi. par. 2. l. 2. diſp. 2. c. 12.*
[g] *Snell. in Eratoſth. Batavo. l. 2. c. 5.*
[h] *Ibidem.*

eſt : ut ſex & nonaginta in libram conſtituerentur, tum quoque duo de quinquaginta aurei, pondere tanto leviore, in ſingulis libris cudi cœperunt. Which conjecture ſeems not altogether improbable, if we reſpect the later Conſuls, and firſt *Cæſars*, in whoſe times we finde the *aurei* to have been double to the *denarii Cæſarei*; but ſurely long before *Juſtinian*, the *aurei*, or as they were then alſo called the *ſolidi*, loſt that proportion to the ſilver, and kept it onely to the *ſemiſſes aurei*, to which they were double, as they were in a treble proportion to the *tremiſſes*.

Wherefore in ſtead of theſe conjectures (which have been the bane of many a good Authour) of *Agricola*, *Villalpandus*, and *Snellius*, I would read the later part of thoſe words of *Pliny*, as the *MSS.* doe, till I can ſee ſome concluding reaſon, or good authority of ancient Authors to the contrary. For I doe not ſee why the Romanes at the firſt might not coin forty *aurei* out of the *libra*, as well as forty ſilver *teruncii* out of the *denarius*: which [1] *Varro* aſſures us they did. And who knows whither at the firſt making of their gold coins, which was ſixty two years, according to *Pliny*, after the firſt coining of ſilver, they endevoured to keep them *in ſuplà ratione*, in reſpect of weight : which graceſull manner they might afterwards introduce by commerce with the Grecians.

[1] *Varro l. 4. de L. Latin.*

And here, ere I proceed any farther in my inquiry after the *Denarius Cæſareus*, I cannot but complain, either of the negligence of former times, or unhappineſſe of ours: in that not

one Authour extant mentions the true weight of the *denarii*, under the *Cæsars*. [k] *Xiphilinus* relates in his epitome of *Dio*, how *Antoninus Caracalla* corrupted, & abased the coins; but makes no mention of the weight. Τῷ δὲ Ἀντωνίνῳ, ταῦτ' ἄλλα καὶ τὸ νόμισμα κίβδηλον ἦν, τόδε ἀργύεον καὶ τὸ χρυσίον, ὃ παρεῖχεν ἡμῖν, τὸ μὲν ἐκ μολίβδου κατηργυρώμενον, τὸ δὲ καὶ ἐκ χαλκοῦ κατακρυσούμενον ἐκδιδόαζετο. *To Antoninus, as other things, so also his mony was adulterated. For the silver & gold, which he gave us, the one was prepared of lead silvered over, and the other of brasse guilt.* [l] Suidas also speaking of the *monetarii* writes thus. Μονιτάριοι δὲ οἱ περὶ τὸ νόμισμα τεχνίται, οὓς ὅτε Αὐρηλιανὸς διέφθειρεν τὸ νόμισμα, καὶ τὸ ἴδιον ἄρχοντα φιλικήσιμον ἀνελόντες ἐμφύλιον ἐγείρουσι πόλεμον, οὓς μόλις Αὐρηλιανὸς χειρωσάμενος ἐξεβαλλύσῃ κολάσεων ὠμότητι κατειργάσατο. *The Monetarii are Artizans employed in the making of mony. These in Aurelians time corrupted the mony, and, having slain their Governour* Felicissimus, *raised a civill warre: whom Aurelianus with much difficulty conquering, put to death with exquisite torments.* And many good laws were made, by severall Emperours against adulterating, and corrupting of coins nd those executed with much severity, even in he time of Christianity. For we finde under th Emperour *Constantine*, that such as offende in this kinde, were not onely put to death, bu to a cruell, and bitter death by fire. *L. OM NES SOLIDI. C. THEOD. SI QVIS SOLI DI CIRCVLVM EXTERIOREM INCI DERIT, VEL ADVLTERATVM IN VEN DENDO SVBIECERIT. Omnes solidi, in qu*

[k] *Xiphilinus in Anton. Caracalla.*

[l] *Suidas in voce* Μονιτάριοι *sive* Μονητάριοι.

bus noſtri vultus, ac veneratio una eſt, uno pretio æſtimandi ſunt, atque vendendi, quanquam diverſa formæ menſura ſit: quod ſiquis aliter fecerit, aut capite puniri debet, aut flammis tradi, vel aliâ pœnâ mortiferâ. Quod ille etiam patietur, qui menſuram circuli exterioris adraſerit, ut ponderis minuat quantitatem, vel figuratum ſolidum, adulterâ imitatione, in vendendo ſubjecerit. In *Conſtantius'* time the ſame puniſhment was inflicted. *L. PRÆMIO. C. THEOD. DE FALSA MONETA. Præmio accuſatoribus propoſito, quicunque ſolidorum adulter potuerit reperiri, vel à quoquam fuerit publicatus, illicò omni dilatione ſubmotâ flammarum exuſtionibus mancipetur.* And afterwards under *Valentinianus, Theodoſius,* and *Arcadius,* they were accounted, and ſuffered as *rei læſæ Majeſtatis. L. FALSÆ MONETÆ. COD. EODEM. Falſæ monetæ rei, quos vulgò paracharactas vocant, Majeſtatis crimine tenentur obnoxii.* But no where is it mentioned concerning the *denarii*, and *quinarii*, which were the ſilver coins, in common uſe, how much ſhould be their weight. Wherefore in ſuch a ſilence of ancient Authors, we have no more ſolid, and ſure foundation of our inquiry: then either by our ſelves to examine the weight of the faireſt coins under the Emperours: or elſe to relate, what others long before our time have obſerved. *Antonius Auguſtinus* in generall informs us, when coins were at their higheſt perfection, and how they began to decline with the Romane Empire: as commonly when mony comes to be abaſed, and that the mint, like the pulſe, beats too ſlowly, and

irregularly, it is an evident ſymptome of ſome diſtempers in the bowels of a State °. * *The medailes of all times* (ſaith he) [*are worthy to be obſerved by Artizans*] *beginning from Alexander the great, in whoſe time they principally flouriſhed, till the Emperour Gallienus, when they chiefly fell together with the Empire. From thence to the end of Juſtinian, there are found good medailes of all the Emperours, but with a notable diminution of their politenes, and ancient perfection. Thoſe which we have after Juſtinian, are unſufferably bad. The fault by all men is aſſigned to the Huns, and Vandals, and Alanes, and Goths, and Longobards, and to other barbarous, and ſavage Nations, who conquered the greateſt part of Europe. Erizzo,* who lived almoſt an hundred yearsſince, a very diligent man in the Romane coins, but it is to be wiſhed that he had uſed more judgment in the explication of them, more particularly informs us. * P *Having compared the weight of thoſe ſorts of mony, which are equall in weight to the Romane denarius, with the medailes of ſilver, which have the heads of the Romane Emperours imprinted, I have found them not a litle different, ſo that as it were all thoſe medailes weigh leſſe then the denarius. And*

° * *Le medaglie di tutti i tempi* [*ſono degne da eſſer oſſervate degli Artifeci*] *commincciando de Aleſſandro magno, nell' età del quale principalmente fiorirono, per fin al tempo dell' Imperador Gallieno, nel quale caddero affatto inſieme con l' imperio. Da indi poi in fin à Giuſtiniano ſi trevano bon medaglie di tutti gli Imperadori ma con notabil perdita della pulitezza, & perfettione antico. Quelpoi che habbiano duppo Giuſtiniano, è tanto cattivo che non ſi può ſoffirire. Et ſe ne dà quaſi da ognuno la colpa à gli Vnni, à i Vandali, à gli Alani, à i Goti, à i Longobardi, & ad altre barbare, & fiere nationi, che ſignoreggiarono gran parte d' Europa. Ant. Auguſt. dialog* 1. P *Havendo io tali monete le quali ſono del peſo di un denario Rom parteggiate di peſo alle medaglie di argento, che hanno ſcolpite le teſte de i Principi Romani, le ho ritrovate differenti non poco del peſo, ſi che quelle medaglie peſano quaſi tutte meno del Denario; & havendo ancora peſate quelle medaglie che hanno ſcolpita la effigie de i Caſari, le ho ſempre ritrovate differenti fra loro nel peſo. Erizzo.*

having

having also weighed those medailes which have the effigies of the Cæsars, I have continually found them different amongst themselves in weight. This uncertainty so troubled *Villalpandus*, after many experiments made at *Rome*, that he knew not what to determine. And it seems ¶ *Blondus* long before conceived it impossible. *Hæc omnia qualia per singulas ætates fuerint, examussim ostendere, non magis difficile, quàm impossibile fuerit, non solùm quia obscuris, & nostrâ ætate ignotis verbis sunt à majoribus tradita, sed quia omnis ferè ætas suam habuit cudendi varietatem, & formam.* Wherefore, for farther satisfaction of the Reader, I shall relate some observations of mine own: especially those of the twelve first *Cæsars*, which I took, with many others, by an accurate balance, from some choice cabinets in *Italy*. And first, I shall begin with the gold coins. For seeing the *aurei* under the former *Cæsars* were *in duplâ ratione* to the *denarii*, therefore the weight of those being known, we cannot be ignorant of the weight of the *denarii Cæsarei*. Besides; they are not subject to be consumed by time, and rust, but onely *ex intertrimento*, and therefore wee may the safelier give credit to them. And lastly, because the difference, though but of a grain, is of some consideration in gold, the Masters of the Mint use to be the more circumspect about them: whereas in silver coins, since it is hardly worth the pains to stand precisely upon the excesse, or defect of every grain, therefore there are few of these so exact, but either exceed, or want, in the very mint, one

¶ *Blondus l. 5. de Roma triumph.*

or two graines, and ſometimes more.

The weight of ſome aurei under the firſt twelve Cæſars.

	Eng: grains.
* C. CAES. COS. III.	CXXIII 7/12
* *A ſecond, on the reverſe,* A. HIRTIVS. PR.	CXXII 1/2
* *A third*	CXXIV 1/2
AVGVSTVS. CAESAR. III. VIR.	CXIX 1/2
A ſecond, on the reverſe, OB CIVES SERVATOS	CXIX 1/2
* *A third, on the reverſe,* DIVOS. AVG. DIVI. F.	CXIX
TIBERIVS	CXVIII 1/2
* *A ſecond* { *On the forepart* TI. CAESAR. DIVI. AVG. F. AVGVSTVS *On the reverſe, a tẽple*	CXVII 1/2
CALIGVLA	
CLAVDIVS, *on the reverſe,* S.P.Q.R. OB. CIVES. SERVATOS	CXVII
A ſecond	CXVII 1/2
A third	CXVIII 1/2
* NERO, *on the reverſe,* SALVS	CXVI
* *A ſecond, on the reverſe,* IVPPITER. CVSTOS	CXIII 1/2
* *A third, on the reverſe,* CONCORDIA. AVGVSTA	CXIII
GALBA, *on the reverſe,* CONCORDIA. PROVINCIARVM	CXV
OTHO	

OTHO, *on the reverſe*, SECVRITAS S.P.Q.R-	CVIII ½
VITELLIVS, *on the reverſe*, LIBERTAS. RESTITVTA	CXII ½
VESPASIANVS, *on the reverſe*, PACI AVGVSTI	CXI
* *A ſecond, on the reverſe*, COS. III TR. POT.	CXIV ½
A third, on the reverſe, PONT. MAX. TR. P. COS. VI	CXI
* *A fourth, on the reverſe*, PACI. AVGVSTI-	CVIII ½
A fifth, on the reverſe, PACI. AVGVSTI	CX
* T. VESPASIANVS, *on the reverſe*, ANNONA. AVG	CIX ½
* DOMITIANVS. COS. II.	CXIII
* *A ſecond*, DOMITIANVS. COS. VI. CAESAR. AUG. F. *on the reverſe*, IVVENTVTIS. PRINCEPS-	CXII ½

Theſe *aurei* were ſelected by me, out of ſeverall others, as the faireſt and intireſt; and amongſt theſe to ſuch as I have prefixed an aſteriſc, they are ſuch as ſeemed ſo perfect, that I could make no juſt objections againſt them. By theſe it appears that [r] *Pliny*, ſpeaking of the gold coins, rightly informs us. *Paulatimq; Principes imminuere pondus, imminniſſe vero ad* XLVIII. *That by degrees the Emperors leſſened the weight* [of the aurei] *to the forty eighth part of the Roman pound*; that is, to the fourth part of the ounce. For this

[r] *Plin. l. 33. c. 3.*

is

is the loweſt weight, that I find, till *Heliogabalus* time, who coined new ſorts of *aurei*, different from what had been the conſtant practiſe of the Romane State: ſome of which vvere the fifcieth part of the *libra Romana*, and others again ſo maſſy, that they were *centeni*, or *bilibres*; which not long after were altered, and aboliſhed, by *Alexander Severus*. The manner is expreſſed by [f] *Ælius Lampridius*, in the life of Alex: Severus. *Formas binarias, ternarias, & quaternarias, & denarias etiam, atque amplius, uſque ad bilibres quoque, & centenas, quas Heliogabalus invenerat, reſolvi præcepit, nec in uſu cujuſquam verſari: atque ex eo his materiæ nomen inditum eſt, cùm diceret plus largiendi hanc eſſe Imperatori cauſam, ſi cum multos ſolidos minores dare poſſet, dans decem vel amplius unâ formâ, triginta, & quinquaginta, & centum dare cogeretur.* Under the ſame *Alex*: *Severus* began the *ſemiſſes aureorum*, and *tremiſſes* to be coined, which had not formerly been in uſe. The *ſemiſſes* were anſwerable in weight to the *denarii Cæſarei*, when they were leaſt, that is, ninety ſix in the Romane pound; though *Agricola*, *Villalpandus*, and others, upon a miſtake, equall them then to the *drachma Attica*. [g] *Ælius Lampridius* writing of *Alex: Severus*, plainly expreſſes that in his time they began. *Tùmq; primum ſemiſſes aureorũ formati ſunt, tunc etiam, cum ad tertiam partẽ aurei vectigal decidiſſet, tremiſſes, dicente Alexandro etiam quartarios futuros, quòd minus non poſſet.* Afterwards, *Conſtantine*, *Conſtantius*, *Iulian*, & other ſucceeding Emperours, leſſened the weight of the *aurei*, whereby there came to be ſeventy two in the

[f] *Lampridius in Alex: Severo.*

[g] *Lampridius in Alex: Severo.*

the Romane pound, ſo that each of them weighed the *ſextula*, or four *ſcrupula*. That the *aurei* of *Conſtantines* time were ſixty two in the Romane pound, is moſt evident out of the *Codex Theodoſianus*, where they are alſo abſolutely called *Solidi*, without the addition of *aurei*.

[u] *L. SIQVIS. C. THEOD. DE PONDERATORIBVS, ET AVRI INLATIONE. Siquis ſolidos appendere voluerit auri cocti, ſeptem ſolidos quaternorum ſcripulorum, noſtris vultibus figuratos, adpendat pro ſingulis unciis.* XIV. *verò pro duabus, juxta hanc formam omnem ſummam debiti inlaturus: eâdem ratione ſervandâ, etſi materiam quis inferat, ut ſolidos dediſſe videatur.*

[x] *Pancirollus*, in his *theſaurus variarum lectionum utriuſque juris*, reads VI. ſolidos, inſtead of VII. *and* XII. *inſtead of* XIV. And that it muſt neceſſarily be ſo, beſides that the *ſolidi* of *Conſtantine* now extant prove as much, may bee collected out of the proportion of weight, vvhich is here aſſigned by *Conſtantine* himſelf to the *ſolidi*, and that is four ſcruples, or the *ſextula*. For the *ſolidus* containing four ſcruples, and the ounce containing twenty four ſcruples, there will therefore be ſixe *ſolidi* in the ounce; againe, the pound conſiſting of twelve ounces, and the ounce of ſixe *ſolidi*, the whole pound therefore will conſiſt of ſeventy two *ſolidi*. Theſe *aurei* by *Iuſtinian* in like manner are termed *ſolidi*. *L. QVOTIESCVNQVE. C. DE SVSCEPTORIBVS, PRÆPOSITIS, ET ARCARIIS.* Where he alſo defines the ſame weight. * *Quotieſcunque certa ſumma ſolidorum pro tituli qualitate debetur, & auri maſſa tranſmittitur,*

[u] *Codex Theodoſ. l. 1. de ponderatoribus.*

[x] *Cui: Pancirolli theſaur. var. lect. utr. juris.*

* *Cod. lib. 10. tit. 70. in reſcripto Valentiniani & Valentis Impp.*

mittitur, * *in* LXXII. *ſolidos libra feratur accepta.* The ſame thing is implicitly confirmed by *Iſidorus* (*l.* 16. *Orig. c.* 24.) *Solidus alio nomine ſextula dicitur, quod iis ſex uncia compleatur. Hunc ut diximus, vulgus aureum ſolidum vocat, cujus tertiam partem ideo dixerunt tremiſſem, quod ſolidum faciat ter miſſus.* Where [z] *Agricola*, I imagine, truly findes fault with him for calling the *ſolidus*, *ſextula*; though the proportion he aſſigns is right, that is, that the *ſolidus* was the ſixth part of the Romane ounce, and contained ἑξαίου σταθμὸν, *the weight of the ſextula*, as it is atteſted by * *Zonaras*: or, which is all one, that ſeventy two *ſolidi* were made out of a Romane pound, as *Juſtinian* before expreſly aſſigned: and as infinite ſtore of the *ſolidi*, or *aurei*, from *Conſtantine* to *Focas*, which I have weighed, manifeſtly prove.

In the ſame place of [a] *Iſidorus* we may collect the reaſon, why the *aureus* was called *ſolidus*. After that, the *ſemiſſes*, and *tremiſſes aurei* were coined, the *aureus* was called *ſolidus*, becauſe nothing was wanting to it. *Solidum enim Antiqui integrum dicebant, & totum*: In which ſenſe the *ſolidus* was alſo taken for the *libra*, or *aſſis*; that is, as the *aſſis* is taken for the whole, according to that uſuall phraſe of Civi-

* This excellent place very hardly eſcaped *Haloanders'* emendation, who had a great minde to have played the Critick, and to have altered it. For he thus writes. *In vetuſto codice in raſam membranam hæc ita repoſita ſunt, ut certum ſit alteram, & fortaſſe genuinam lectionem ſublatam, & legendum, duodequinquaginta, aut certe quinquaginta.* A goodly conſequence, becauſe the parchment was ſcraped, & the firſt writing altered, therefore the true reading muſt be expunged and a falſe one put in: whereas he might with more candor, and ingenuity, have concluded the contrary, that the falſe one was expunged by the ſcribe, and the true one inſerted. For who uſes in copying of *MSS.* to ſcrape any thing out of the *apographum*, but onely when by collating it he findes it to be different from the originall?

[z] *Agricola l.* 2. *de pond. & temperat. monetarum.* * *Zonar. l.* 3. [a] *Iſidorus l.* 16. *Orig. c.* 24.

lians

lians *ex asse hæres*, when one is heir to the whole inheritance: so the *solidus* was taken for the whole *assis*. [b] *Volusius Metianus. Prima divisio solidi, id est libræ quod as vocatur, in duas partes dimidias deducitur. From hence* (saith [c] Salmasius) *the Romanes called that the solidus aureus, when it had the same weight in gold, which the solidus, that is, the assis had in respect of brasse, that is, two drachmes.* Though I rather suppose that the *aureus* was called *solidus*, first of all in *Severus'* time, not for containing two *denarii* in weight, (which *Salmasius* cals drachmes) for so it alwaies did under the later Consuls, and first Emperours, but because the *aureus* was then first d vided into two parts, that is, into the *semisses*, and *tremisses*, and so relatively to these the whole *aureus* was rightly called *solidus*. Of the same opinion is [d] *Agricola. Quos aureos, cùm respectum ad semisses & tremisses haberent, tunc primò dixerunt solidos, quòd semisses ex dimidiâ eorum parte, tremisses ex tertia constarent.*

[b] *Vol. Metianus de assis distrib.*

[c] *Hinc & solidum aureum dixere Romani, ubi idem pondus habere cœpit in auro, quod solidus, id est, as haberet in ære, duarum nempe drachmarum. Salmas. de modo Usur.*

[d] *Agricola l. 2. de pond. & temp. monetar.*

The *semisses*, and *tremisses*, of the other Emperours, at some distance after *Severus*, came to be lesse in the same proportion, as the *aurei* were lessened. For the *aurei* of *Severus* were double to the *denarii Cæsarei*, and therefore but forty eight in the pound, and not fifty as *Heliogabalus* made, whose e rour *Severus* corrected. But when the later Emperours made seventy two *aurei* out of the Romane pound, the *semisses* came also to be diminished, and were half of these new *aurei*, and not of the former, and the *tremisses* the third part. And here the *aurei* lost that proportion, which they kept before of being

ing double to the *denarii*. Of these *tremisses* is *Justinian* to be understood, *L. FORTISS. MILITIBVS. COD. DE MILITARI VESTE Fortissimis militibus nostris per Illyricum non binos tremisses pro singulis clamydibus, sed singulos solidos dari præcipimus.* And this may be farther proved by a fair * *tremissis* in gold of mine own of *Justinian*, with the inscription D.N. IVSTINIANVS, weighing twenty one grains English, and therefore wanting onely three grains $\frac{1}{2}$, which it may have lost by time: otherwise it would be exactly the 216th part of the Romane pound, that is, the third part of the *aureus*, or *solidus* of those times: whereas if it had been coined to the proportion of the *aureus*, when there were forty eight in the pound, it should have weighed 36 grains $\frac{1}{2}$, so that it must have lost 15 $\frac{1}{2}$, a difference so great, in a peece of gold so fair, and withall of so small a quantity, altogether improbable. And therefore this coin alone, if no more were extant, would confute their opinion, who maintain, that the *tremissis* of *Justinian* differed not from the *tremissis* of *Severus*, and consequently the *aurei* of them both, better then the reasons produced by [b] *Covarruvias* to the contrary have done.

* I have since perused another *tremissis* in gold, a very fair one, with this inscription D.N. IVSTINVS. P F. AVG. weighing twenty two grains and better; which formerly belonged to the learned Geographer *Ortelius*. Besides a third, of *Majorianus* with CONOB superscribed (which signifies *Constantinopolitanum obrizum* or *Constantinopoli obsignatũ*) weighing likewise twenty two grains. And a fourth, of *Iustinian*, weighing twenty three.

[b] *Covarruvias tom. 1. c. 3. paragr. 1. & 2. de vet. aureis, & argenteis numis.*

The

The weight of ſome of the faireſt Aurei *of the Romane Emperours, from Nerva to Heraclius.*

On the fore part of the Aurei *are theſe characters.*	*On the reverſe theſe.*	Eng: grains.
IMP. NERVA. CAES. AVG. P.M. TR. P.II. COS.IIII. P P.	FIDES. EXERCITVS—	111 1/2
IMP. TRAIANVS. AVG. GER. DAC. P.M. TR P. COS. VI. P.P	DIVVS. PATER. TRAIANI—	110 1/2
IMP. CAESAR. TRAIAN. HADRIANVS AVG.	COS. II. P. M. TR. P. P. AVG—	121 1/2
ANTONINVS. AVG. PIVS. P.P. TR. P. XII.	COS. IIII—	119 1/2
ANTONINVS. AVG. ARMENIACVS	P. M. TR. P. XVIII. IMP. II. COS. III *in Scuto Victoria.* VIC. AVG-	118 1/2
IMP. CAES. L. AVREL. VERVS. AVG	CONCORDIAE. AVGVSTOR— TR. P. II. COS. II	117 1/2
L. VERVS. AVG. ARM. PARTHI. MAX	TR. P. V. IMP. III. COS. II—	113 1/2
M. COMM. ANT. P. FEL. AVG - P. P	IOVI. VLTORI—	114
SEVER. P. AVG P. M. TR. P. X. COS. III	FELICITAS. SAECVLI-	114 1/2
IMP. M. ANT. GORDIANVS. AFR. AVG	CAESAR. M. ANT. GORDIANVS. AFR. AUG—	114
Trebonianus Gallus	P. M. TR. P. IIII. COS II. P. P—	75 3/4
Gallienus—	P. M. TR. P. III. COS. P. P	74 1/2
IMP. PROBVS. P. F. AVG	VICTORIOSO. SEMPER—	105
IMP C. CARINVS. P. F. AVG	SPES. AVGG—	72 1/2
... DIOCLETIANVS. P. F. AVG	IOVI. CONSERVAT. AVGG—	77 1/2

MAXIMI-

... MAXIMIANVS.	VIRTVS. MILITVM. T-	74
CONSTANTINVS. MAX. AVG	SECVRITAS. REIPVBLI- CAE——— *infra* TR	70 ½
CONSTANTINVS. P.F. AVG.	VIRTVS. AVGVSTI. N.-	68
CONSTANTIVS	GLORIA. REIPUBLICAE VOT XXX MVLTIS. XXXX *infra* SNNS——	70
IM. CAE. MAGNENTIVS. AVG	VICTORIA. AVG. LIB. ROMANOR——— *infra* TR	70 ½
FL. CL. IVLIANVS. P. F. AVG	VOT. X. MVLT. XX. *infra* ANT———	68 ½
D. N. IOVIANVS. P. F. PERP. AVG.	SECVRITAS. REIPVB- LICAE——— VOT. V. MVLT. X *in- fra* COS. P	68
D. N. VALENS. P. F. AVG	RESTITVTOR. REIP. *infra* ANTO———	68 ½
D. N. VALENTINIANVS. P. F. AVG	RESTITVTOR. REI- PVBLICAE———	69
A second ———	———	69
D. N. GRATIANVS. P. F. AVG	VICTORIA. AVGG. *in- fra* TROES———	69
A second ———	———	68 ½
D. N. THEODOSIVS P. F. AVG	VICTORIA. AVGG. *in- fra* CON———	68
A second ———	———	69
D. N. ARCADIVS. P. F. AVG	NOVA. SPES. REIPVB- LICAE——— *intra corollam* XX. XXX *infra* CONOB	67 ½
A second———	———	68
D. N. HONORIVS. P. F. AVG	VICTORIA. AVGGG.— *ſtatua, cui inſcript.* R. V *infra* CONOB	69
A second ———	———	69
A third D. N. HONORIVS. P. F. AVG	VICTORIA. AVGGG. N. D. *infra* CONOB —-	68
D. N. THEODOSIVS. P. F. AVG	IMP. XXXXII. COS. XVII P. F. *infra* CONOB —	69 ½
D. N. PLA. VALENTINIANVS.	VICTORIA. AVGGG.	D. N

	infra CONOB	68
D.N. VALENTINIANVS. AVG	VICTORIA. AVGGG *infra* CONOB	69 $\frac{1}{2}$
D. N. VALENTINIANVS. P. F. AVG	VICTORIA. AVGG. *infra* TROES	68
D. N. IVL. NEPOS. P.F. AVG.	VICTORIA. AVGGG. A. *infra* CONOB	69 $\frac{1}{4}$
D.N.ANASTASIVS.P.F.AVG	VICTORIA. AVGGG. *infra* CONOB	68 $\frac{1}{2}$
D.N.IVSTINIANVS.P.F.AVG	VICTORIA. AVGGG. A.*infra* CONOB	69
D.N. FOCAS. PERP.AVG	VICTORIA. AVGG. *infra* CONOB	68
D.N.FOCAS.PERP.AVG	VICTORIA. AVG. *infra* CONOB	69 $\frac{1}{4}$
...HERACLIVS		69 $\frac{1}{2}$
a second		69 $\frac{1}{8}$

And thus much of the *aurei* under the former, and later Emperours, as they serve to illustrate, and prove the weight of the *denarii Cæsarei*, which is our next, and principall inquiry.

The *denarii* under the *Cæsars* were almost as various, and unconstant, as the *aurei*, sometimes more, sometimes lesse; and if they had not been so, they could not have kept that proportion to the *aurei* of the former Emperours, which we assigned. From *Augustus'* time to *Vespasian*, as I finde by examining many of them, they continually almost decreased, till from being the seventh part of the Roman ounce, they came now to be the eighth part: and therefore ninety sixe were coined out of the Romane *libra*, whereas before under the Consuls eighty four. From *Vespasian* to *Alex: Severus*, as far as I have obser-

ved, the silver continued at a kinde of stay in respect of weight, excepting onely such coins, as upon some extraordinary occasion, both then, and in the first Emperours time, were stamped, either in honour of the Prince, or of the Empresse, and *Augusta familia*, or else in memory of some eminent action. These last, most usually were equall to the *denarii Consulares*, and many of them had these characters E X.S.C or else S.P.Q.R Under *Severus*, and *Gordianus*, the *denarii* began to recover their primitive weight, and came to be equall to the *denarii Consulares*, the half of which also were exactly the *Quinarii:* and so continued during the succeeding Emperours till *Justinian*, with litle diminution, but most commonly with a notable abasement, and mixture of allay. After *Justinian*, there happened such a deluge of barbarous Nations, which overflowed the greatest part of *Europe*, that not only the coins, but even the liberall arts, and sciences, began with the majesty of the Empire to decline from their first lustre, and perfection.

Wherefore I shall not speak of the μιλιαρήσιον, or *μιλιαρίσιον*, a sort of silver coin in use, before, and after *Justinian*, which some collect out of *Cedrenus* to have been the eighth part of the ounce, and therefore equall to the *denarius*, in the lowest valuation; though * *Suidas* renders μιλιαρήσιον τὸ τῦ νομίσματος δίκαιον, and the *Scholiastes Basilic. Eclog.* 23. διωβόλιον, and to contain twenty four φόλλεις. But I shall not positively determine, either the weight of this, or of the χαράκτον, or *siliqua* in silver, both coined when the Emperiall seat was translated to

Cedrenus in histor. compend.

* *Suidas in voce* Μιλιαρήσιον.

to *Byzantium*, unleſſe I had examined ſome of the faireſt of them. And for the ſame reaſon I ſhalll not define the Hebrew *denarius*, mentioned by *Elias* in *Thisbite*, in the word דינר, & by * *Moſes Gerundenſis* upon *Exodus*, and by the *Chaldy Paraphraſe*, 2 *Reg.* 5. 5. which I imagine to have been no other then the Romane *denarius*, uſed by the Jews: neither ſhall I determine the Arabian دينار *dinar*, and درهم *derham*: the former of which the Rabbins call דינרא ערבאי, uſed by *Rhaſis*, *Avicen*, *Meſue*, and by ſeverall other Arabians, both Phyſicians, and Hiſtorians. All that can certainly be concluded is this, that by the دينار *dinar*, when wee ſpeak of a coin, is meant ſometime the *denarius*, and ſometime the *aureus*: but when we ſpeak of a weight, alwaies the *aureus* is underſtood: as by the درهم *derham*, the δραχμὴ, or ſilver dram. But ſurely the quality of the thing is different from the name: the ſilver drachme of the Arabians, as it is generally now uſed in the Mahometane dominions in the Eaſt, conſiſting of XLVII. $\frac{11}{20}$. grains Engliſh, (as I have found by weighing many of them) which is much leſſe then either the *Drachma Attica*, or the *denarius Conſularis*: & ſomewhat leſſe then the *Denarius Cæſareus*. And yet it is not improbable, but that this may have continued with thē, without any diminution, for ſixe, or ſeven hundred years to our times: as well as the Romane pound, and ounce, have continued intire ſixteen hundred years, and bet-

* p. 72. col. 4.

better. But to omit any farther proſecutiõ of the درهم & دينار of the Arabians, which may hereafter more fully be diſcuſſed, when we ſhall handle their meaſures, and weights, and to goe on with our diſcourſe of the Romane *denarius*. After the breaking in of ſo many barbarous Nations, as of a torrent, into the Romane Empire, the *denarius* began generally to be diſuſed, every one almoſt of theſe, as an argument of their Soveraignty, and conqueſts, making new coins of their own: or elſe ſuch as continued the former, either by allaies ſo abaſed the fineneſſe, and valuation of the coins, or by ſeverall diminutions ſo impaired the weight, that the *denarius* totally fell, and at laſt almoſt vaniſhed into nothing. Neither will this ſeem ſtrange, if we ſhall conſider that the like alteration, in reſpect of weight hath happened, by the revolution of a leſſe time, in our own coins. I ſhall inſtance in our *denarius*, or *penny*, which in *Ethelreds* time, that is, a little more then 1000. years ſince, was the twentieth part of the Troy, or ſilver ounce: as [b] M. *Lambard* in his Saxon Gloſſary obſerves, and a by experience I have found (and the ſame proportion was anciently obſerved by the [c] French in their *denier*). This proportion continued ſucceſſively to *Edw.* the firſt, in whoſe time we find the weight of the *denarius* by [*] Statute to be thus defined. *Per ordinationes totius regni Angliæ denarius Anglia, qui vocatur Sterlingus, rotundus ſine tonſurâ, ponderabit 32 grana frumenti in medio ſpicæ, & 20 denarii faciunt unciã, & 12 unciæ faciunt libram.* Under [d] *Edward* the third it came firſt

[b] *Lambardi Gloſſarium Cantabrig: 1644*

[c] *In appendice libri de limit. agrorum: Iuxta Gallos vigeſima pars unciæ denarius eſt, & 12 denarii ſolidum reddunt.*

[*] *Stat. 31. Edov. 1.*

[d] *Stat. 9. Ed. 3.*

first to be diminished to the twenty sixth part of the Troy ounce: and under [c] *Henry* the sixth it fell to be the two and thirtieth. In [f] *Edward* the fourths time it came to be the fortieth. Under [g] *Henry* the eighth at first it was the fortieth, then the forty fifth. Afterward sixty pence were coined out of the ounce in the second year of [h] Queen *Elizabeth*; and during her reign sixty two: which proportion is observed in these times. So that it is evident that *Ethelreds* penny was bigger then three of ours. And after times may see this of ours, as well as the Romane *Denarius*, to be quite diminished, and brought to nothing. For if either our own exigencies, or the exigencies of forain States, with whom we have commerce, cause us, or them (as occasions will never be wanting) to alter the proportions of the gold, and silver coins, either in respect of weight, or in respect of purity, or lastly, in respect of the valuation, the gold bears to silver; by all, or some of these causes, there will inevitably happen such a diminution of the penny (and proportionably of our other coins) that at length it will not be worth the coining. But I leave this speculation to such, whom it doth more neerly concern. And certainly it is a consideration not of the least importance; mony being as the sinews, and strength of a State, so the life, and soul of commerce: and if those advantages, which one Country may make upon another, in the mystery of exchanges, and valuation of coins, be not throughly discovered, and prevented, by such as sit at the helm of the State, it may fare with them after much com-

[c] *Stat. 2. Hen. 6.*
[f] *Stat. 5. Ed. 4.*
[g] *Stat. 35 H. 8.*
[h] *Stat. 2. El:*

merce, as with some bodies after much food, that instead of growing full, and fat, they may pine away, & fall into an irrecoverable consumption. But I return to the Romane *denarius*, which vve have brought so low, that there is nothing now left of it, but only the name: and that also suffered an * alteration. For the later Greeks instead of the δηνάριον called it the δηνέριον: and both Greeks, and Latines, and sometimes the Arabians, took it not in the same sense, as it passed for in the first institution, that is, for a silver coin, worth in valuation ten, or sixteen *asses*, but for any sort of coin whatsoever. And therefore [i] *Meursius'* observation, in his *Glossarium Græco-Barbarum*, is worth our consideration. *Postea δηνέριον dixerunt ævo corruptiore, & generaliter pro quâvis pecuniâ. Sicut Itali denaro. Galli Denier, Hispani Dinero. Anonymus de bello sacro.*

Δηνέρια ἔχετε πολλὰ, δῶτε τῷ ταβερνάρῃ,
Ἐπάρατε πολὺν κρασὶ καὶ πίνετε μετ' αὐτοῦς.

Whence the learned [k] *Jos. Scaliger* rightly observes, that, *ultimis temporibus denarii pro exigua stipe usurpati sunt, ut hodie in Gallia. Imperator Aurelianus: Philippeos minutulos quinquagenos, æris denarios centum. Eos Vopiscus in Bonoso sestertios æris vocat. Macrobius de nummo ratito loquens, qui erat æreus:* Ita fuisse signatum hodieque intelligitur in alcæ lusu, cùm pueri denarios in sublime jactantes, capita, aut navia lusu teste vetustatis exclamant. *In Evangelio secundum Marcum* 12. λεπτὰ δύο ὅ ἐστι κοδράντης. *Hilarius duos denarios viduæ inopis Deo acceptiores. Luc.* 10. ἐκ-

* In the same manner the *solidus*, or *aureus*, as it lost its valuation, so suffered an alteration in the Greek name. For instead of χρυσοῦς we finde the Glosses to render it χρυσινοῦς. *Glossæ.* χρυσινοῦς *solidus:* and in the same Glosses we read δηνάριον interpreted *Biniones*, and δηνάριον *sestertium*, and δηνάριον λευκὸν *asprum.*

[i] *Meursii Glossarium Græco-Barbar: in voce* δηνάριον.

[k] *Scalig. de re numm.*

10. ἐνβαλὼν δύο δηνάρια, *Ambroſius, duo æris. Vetuſtiſſimus eſt igitur denarii uſus ἀντὶ τοῦ χαλκισμοῦ, vel ſtipe.* Thus far *Scaliger.*

Such an uncertainty being then, as we have mentioned, both of the *aurei*, and *denarii*, under the firſt *Cæſars*, in whoſe times the pureſt coins, and the beſt wits moſt flouriſhed, and ſuch an abaſement, and impureneſſe of the ſilver under the later Emperours, no reaſonable man can imagine, that either the ancient Grammarians, Poets, Oratours, Hiſtorians, or eſpecially Phyſicians, whom it did moſt concern to bee preciſe, and moſt of which lived under the former Emperours, did ever allude to the weight of the *denarius Cæſareus*, but rather to the *Conſularis*. And to this onely, and to no other, did the Attick drachme mentioned by *Dioſcorides*, *Cleopatra*, *Galen*, *Julius Pollux*, *Oribaſius*, and the reſt of the Greek Authors correſpond. And thus have we finiſhed our diſcourſe concerning the *denarius*, in the notion, and acception of the Ancients, both Greeks, and Latines.

Our next labour ſhould be to compare it with the ſtandards for weights of divers Nations, uſed in theſe times. For which I had recourſe to the publick *Zygoſtatæ*, and *Ponderatores*, in my travails abroad: and for my obſervations I muſt refer the Reader to this enſuing Table.

* These weights (excepting *the rotulo of Damascus*) were diligently compared with the Originals, and Standards: in like manner as I examined the measures above described. In both which if any shall finde some lide difference, from some Originals, as five, or six grains in the English pound, & it may be one, or two parts of a thousand in the English foot, different from *the Standards in the Exchequer, or the Tower, or at Winchester*, or some other place, it is not much to be wondred. For I have found as great differences in collating the English Standards themselves: and have heard *Gaspar Bertio* (one of the exactest men in this kind that I have known) to complain of the same diversity at *Rome*. And though it bee a shame that in any well governed Kingdome, or Common-wealth, the Standards, which are the rules of *commutative justice*, should

*A Table of the gold, and silver * weights of severall Nations, taken from their Standards, and compared with the Denarius.*

	Eng. grains.
SUch parts, or grains, of the *English* Standard for gold, and silver (or of the Troy weight) as the *denarius Consularis* containeth 62, according to the weight of the best coins, or according to the weight of the *Congius* of *Vespasian*	6: $\frac{3}{4}$
The ancient, and modern Romane ounce containeth	438
The ancient, and modern Romane pound, consisting of twelve ounces, containeth	5256
The Troy pound, or English Standard of gold & silver; consisting of twelve ounces, containeth	5760
The Troy, or English ounce, (to which five shillings two pence of our mony in these times are equall) containeth	480
The Paris pound, or Standard for gold and silver, of XVI ounces	7560
The Paris ounce	472 $\frac{1}{2}$
The Spanish pound, or Standard for gold and silver, of sixteen ounces, taken by me at *Gibraltar*	7090
Another weighed by me at *Gibraltar*	7085

The

The Spaniſh pound in Villalpandus, is (I know not by what errour) but	7035
The Spaniſh ounce at *Gibraltar* (the pound conſiſting of 7090. grai. Engliſh)	443 $\frac{3}{4}$
The Venetian pound, or Standard for gold and ſilver, of XII. oun.	5528
The Venetian ounce	460 $\frac{2}{3}$
The Neapolitane pound, or Standard for gold & ſilver, of twelve ounces	4950
The Neapolitane ounce	412 $\frac{1}{2}$
The pound, or Standard for gold and ſilver, of twelve ounces, at Florence, Piſa, and Ligorn	5286
The ounce at Florence, Piſa, and Ligorn	440 $\frac{1}{2}$
The pound, or ſtandard, at Siena, for gold & ſilver of twelve oun.	5178
The ounce at Siena	431 $\frac{1}{2}$
The ounce at Genoa, for gold and ſilver	405 $\frac{1}{2}$
The Turkiſh Okeh, or Oke, at Conſtantinople, conſiſting of four hundred ſilver drams	19128
The ſilver dram generally uſed in the great Turks' dominions: as alſo in Perſia, and in the Moguls' Countries, if I be not miſinformed	47 $\frac{7}{8}$
The Turkiſh ſultani, or Ægyptian ſherif, being a gold coin, with wch the Barbary & Venetian *chequeen*, and Norimberg ducat, within a grain more, or leſſe, agree	53 $\frac{1}{2}$

The

be unequall, & therefore unjuſt; yet unleſſe more art, and circumſpection be uſed, then hitherto hath been put in practiſe, it is impoſſible but ſuch inequalities will creep in.

But this obſervation of mine by ſome may be thought too nice, and curious. That which follows, I am certain, is as neceſſary, as the preſervation of the life of many a man. And that is, that ſome Phyſitians erroneouſly imagine the *granum auri* to be alike in all Nations. And therefore *Fernelius*, a very able man (who, I think, was the firſt Authour of that opinion) writes thus. (*Fern. l. 4. c. 6. Method. Medendi*) *Granum, cui tanquam baſi reliqua iaintuntur pondera, ratum conſtanſque eſſe decet: neque id granum eſſe hordei, neque tritici, neque ciceris, neque frugis ullius, aut leguminis, quod nullum par ſit ubique gentium pondus. At vero nummarium minutū, quod aurifabri granum appellant, & Latinè momentum dici poteſt,*

The *Ratel*, or *Rotulo*, for gold and silver of 144. drams, at Cairo—	6886 $\frac{2}{17}$
The *Ratel*, or *Rotulo*, for silk of 720 drams, at Damascus (with which I suppose they there formerly weighed their gold and silver; because most Countries use the same weights for silks, gold, and silver)—	34430 $\frac{2}{17}$

omnibus mundi nationibus unum idemque est, & stabile, quod auri sacra fames, & opum furiosa libido, inviolatè & incorruptè servat, idque signis & exemplaribus undique identidem collatis. Indeed it was an usefull fancy of his to think of some common measure, in which all Nations might concur: though it is more to be wished for, then ever to be expected: But that illeveratiõ of his, *inviolatè, & incorruptè servat, idq; signis & exẽplaribus undiq; identidẽ collatis*, from a man of such rare abilities, I cannot but extremely wonder at. For if we shall goe no farther to confute his assertion, then to compare our *grana auri* with *those of Paris*, which *Fernelius* used, we shall find ours much bigger: XXIX. English grains almost equalling XXVI. of Paris. Or if we shall compare the *Spanish grana auri, with his*, we shall finde those much lesse: XXVI. Spanish grains weighing but XXVIII. $\frac{1}{2}$. of his at Paris. The like could I demonstrate in those of other Countries. By which dangerous, and notable errour, for want either of due care, or an exact balance, we may conceive that whatsoever also is delivered by the Ancients, in the like nature, is not presently without due examination to be credited.

In this Table I judged it much fitter to compare the *denarius*, with the Standards for gold, and silver of severall Nations, then with their gold and silver coins, now currant. Because the pounds, and ounces of the Standard, continue alway the same; whereas the gold, and silver coins, being cut in severall proportions, according to the exigencies of the State, admit of severall alterations, and diminutions.

The

The Conclvsion.

IT was my intention from the *Pes Rom.* and *denarius*, together with the *Congius of Vespasian*, to have deduced the other weights, and measures, used by the Romanes; and from those of the Romanes, by such testimonies, as are upon record in the writings of the Ancients, to have inferred those of the *Hebrews*, *Babylonians*, *Egyptians*, *Grecians*, *and of other Nations*. A work I confesse intricate, and full of difficulties: wherein I could expect neither to give my self, nor others satisfaction, without first laying some sure, and solid principles for the *basis*, and foundation. Therefore that occasioned me to insist the more largely in the prosecution of the *pes Rom.* and *denarius*, and to examine all the waies, I could possibly imagine, for the evident proof, and confirmation of them. What in this kind I have done, and with how much truth, and diligence, I leave to the impartiall test of after times, the rest at more leisure may be perfected. Yet these following observations, as a *coronis* to the whole work, I thought would not be unacceptable, if by way of anticipation I communicated them to the world: and those are how the Originals, and Standards, of weights, and measures, notwithstanding the revolutions, and vicissitudes of Empires, may be perpetuated to posterity. Amongst

mongſt ſeverall waies, which I have thought of, I know none more certain, and unqueſtionable, then to compare them with ſome remarkable, and laſting monuments, in remote Countries, that have ſtood unimpaired for many hundred years, and are like to continue as many more. In which kinde I made choice of *the firſt, and moſt eaſterly of the three great Pyramids in Egypt; of the baſis of that admirable Corinthian pillar*, erected (as I ſuppoſe) by one of the *Ptolemies*, *a quarter of a mile diſtant to the South from Alexandria*, being one vaſt, and entire marble ſtone: *Of the rock at Tarracina*, or *Anxur*, where it adjoins to the *via Appia*, and almoſt touches the *Tyrrhene* ſea: *Of the gate, or entrance into the Pantheon*, or Temple of *Agrippa*, dedicated by him to all the gods, and by the Chriſtians to all Saints. *Of the Porta ſancta*, in that new, and exquiſite ſtructure of *Saint Peters Church in Rome*. If the like had been attempted by ſome of the ancient Mathematicians, our times would have been freed from much uncertainty, in diſcovering the weights, and meaſures of the Greeks, and Latines.

The firſt, and moſt Eaſterly of the three great Pyramids in Ægypt, hath on the North ſide a ſquare deſcent, when you are entred a litle paſt the mouth of it, there is a joint, or line, made by the meeting of two ſmooth, and poliſhed ſtones over your head, which are paral-

lel

sel to those under your feet, the breadth at that joint, or line, is 3 feet and $\frac{40}{1000}$ of the English foot.

Within the Pyramid, and about the midst of it, there is a fair room, or chamber, the top of which is flat, and covered with 9 massy stones: in it, there stands a hollow tombe of one entire marble stone: the length of the South side of this room at the joint, or line, where the first, and second rowes of stone meet, is 34 feet $\frac{100}{1000}$

The breadth of the west side of the same room at the joint, or line, where the first, and second row of stones meet, is 17 feet $\frac{100}{1000}$.

The hollow, or inner part, of the marble tomb neer the top, on the west side of it, is in length 6 feet $\frac{200}{1000}$.

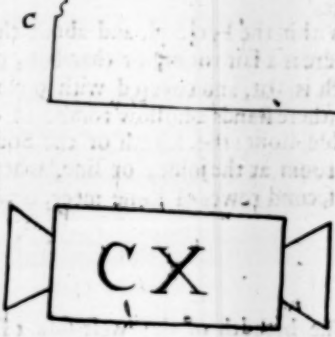
The hollow, or inner part, of the marble tomb, neer the top of it, on the north side, is in breadth a feet $\frac{100}{1000}$.

The

The *basis* of the vast *Corinthian* pillar, about a quarter of a mile from *Alexandria* to the South, on the West side of the pillar at *a b*, is in breadth 12 feet $\frac{510}{1000}$

at *c d* it is 14 feet $\frac{417}{1000}$

The rock at *Tarracina*, or *Anxur*, neer the *via Appia*, close by the *Tyrrhene* sea, hath these figures, besides severall others in the same perpendicular, very deeply ingraven.



The uppermost line *b c*, over the figures CXX, in the innermost, and deepest part of the ingraving, is in length 4 English feet, and $\frac{702}{1000}$

The lowermost line *d a*, in the innermost, and deepest part of the ingraving, is in length 4 feet $\frac{602}{1000}$

The

The ſtately gate, or entrance, into the Pantheon, or Temple built by *Agrippa* in *Rome*, the jambes, and top, and bottome of it, being all of one intire marble ſtone, is in breadth between the jambes, or ſides, ſome three inches above the bottome, and ſome nine inches within, nineteen feet $\frac{602}{1000}$

The *Porta ſancta*, on the right hand of the frontiſpice of Saint *Peters* Church in *Rome*, is in breadth on the pavement, or threſhold, between the jambes, or ſides of the entrance, eleven feet $\frac{928}{1000}$

The great gate, or entrance, which is the middlemoſt of the five in the frontiſpice of Saint *Peters* Church in *Rome*, the doors of which are covered with leaves of braſſe, with very fair and exquiſite figures, is in breadth on the pavement, or threſhold, between the jambes, or ſides of it, eleven feet $\frac{948}{1000}$

The meaſures being fixed, we may likewiſe fixe the weights in this manner; by making a veſſell of a cubicall figure, anſwerable to the proportion of any one of theſe feet, or palms, or braces, which are deſcribed in the Table at the end of the firſt Treatiſe. This cubicall veſſell being filled with cleer fountain water, we are to weigh it with an exact balance, and to expreſſe, the weight of it by ſome one of thoſe weights, which we have placed in a Table at the end of the ſecond Treatiſe. The ſide of this cube being known, and the weight of it in water defined, the reſt of the weights in the ſecond Table, by way of conſequence by thoſe proportions, which we have aſſigned, may be diſcovered.

red. Thus for example: the Romane foot described by *Villalpandus* is nine hundred eighty five parts, such as the Englisth foot contains a thousand: this being cubed (saith he) weighs of fountain water eighty Romane pounds. If therefore there be given nine hundred eighty five parts of a thousand of the Englisth foot, the cube of this will give us eighty Romane pounds in fountain water: and consequently the other weights will be discovered by those proportions, we have assigned to them, in respect of the Romane pound. Again, eighty Romane pounds of water being given, if we reduce this into a cubicall body, the side of it will give the Romane foot described by *Villalpandus*: and consequently the other measures may be deduced, by those proportions we have given them in a peculiar Table. Whereby it appears, that as *by measures* weights may be preserved, so on the contrary *by weights* measures may be restored.

Some directions to be obſerved *in comparing the valuations of coins.*

IN comparing the valuations, either of ancient coins with modern, or of modern one with another, we are to conſider: firſt, the *intrinſeck* of them, and then the *extrinſeck*. The intrinſeck is either the *fineneſſe* of the coin in reſpect of metall, or the *gravity* in reſpect of weight. The extrinſeck I term firſt, the *character* imprinted on the coin: and ſecondly, the *valuation* injoined by the Prince, or State: by which character, and valuation, what *originally*, and *materially*, was but common metall, or plate, comes now *legally*, and *formally*, to be currant mony. With theſe limitations, if we ſhall compare ancient coins with modern, and modern one with another, it will be no difficult matter to proportion out their ſeverall reſpective valuations; and withall to reconcile the ſeeming repugnancies, either of ancient coins, now found, differing from the traditions of ancient Authors: or the traditions of ancient Authors differing amongſt themſelves.

I ſhall firſt give an inſtance of modern coins compared with modern, in our Engliſh mony compared with that of *Spain*, as being moſt familiar

miliar to us: the application of which will by analogy serve for all other distinct States, and times, using distinct coins.

In comparing therefore *English* mony with *Spanish* mony in *England*, or *Spanish mony with English* in *Spain*, we are thus to proceed: First, we are to examine whither they be of a like fineneſſe, for the *intrinſeck*; if they be, then an ounce of *Engliſh* mony, and an ounce of *Spaniſh* (ſuppoſing the weight of the ounce to be alike) will bee of like value in any other Country out of *England*, and *Spain*; where neither are currant, but onely conſidered as ſo much metal, or plate. Secondly, we are to conſider the *extrinſeck*, that is, the form, and ſtamp of the coin, with the valuation of it by the injunction of the Prince of either State; and here that which before was *equall*, comes now to be *unequall*. For an ounce of *Engliſh* mony in *England* comes to be more worth, then an ounce of *Spaniſh* mony in *England*: becauſe this wants the character, ſtamp, and valuation of our Princes, whereby it is currant: and for the ſame reaſon will an ounce of *Engliſh* mony be leſſe in valuation, then an ounce of *Spaniſh* mony in *Spain*, ſuppoſing (as I ſaid) the ounce in both Countries to be exactly one and the ſame.

The ſame analogy will be, if we compare ancient coins, as thoſe of the *Hebrews*, *Greeks*, and *Romanes*, with our *modern coins*. We are firſt, to conſider the *intrinſeck* of them, whither they be of a like weight, and fineneſſe for the metall, with ours: and this is the *naturall*, or

phyſical

physicall consideration. From whence we may conclude, that if, for example, so many *Attick tetradrachmes* doe equall in pureneſſe, and weight; ſo many of our *Engliſh* ſhillings, newly brought from the mint, or ſo many of our *Troy, or ſilver ounces*, taken from the Standard, then are they to be balanced with theſe in the acception of them as plate; and a ſilverſmith, abſtracting from the *extrinſeck*, that were to melt them both, would give a like value for them both. But if we ſecondly, look upon them with the image, and character of the State, and in the notion of mony, which is *the politick conſideration*, then that which before in the *trutinâ*, and ſcale, was equall, in the *foro*, and in commerce, comes to be unequall: and an ounce of *Engliſh* mony ſhall paſſe for more, then an ounce in *Attick tetradrachmes*, with reference to the expenſes of the mint, and to the civill valuation, depending upon a mandate, or law, inacted by the Prince.

In like manner will it be, if we compare ancient coins with ancient, made in different States, as it is in comparing ancient with modern.

Upon theſe grounds of reaſon it will follow, that whereas the Romane Authours make the *denarius Conſularis* to be equall to the *drachma Attica*, and the *Greeks* equall the *drachma Attica* to the *denarius Conſularis*, that both ſay true; and yet both of them, if we ſpeak ſtrictly, and exactly, may be deceived. For the *denarius Conſularis* examined by *the balance, which is the beſt judge of the intrinſeck* (I ſpeak of the

intrinſeck in reſpect of weight, and not of the *intrinſeck in reſpect of fineneſſe*, that being beſt diſcovered by the *ſcale*, and this by the *teſt*: which laſt for the more cleerneſſe of my diſcourſe, I ſuppoſe in all theſe coins to be alike). I ſay the *Denarius Conſularis* is found by me, contrary to the opinion of all modern vvriters, to be lighter, then the *drachma Attica*: and therefore, to ſpeak ſtrictly, and preciſely, cannot be equall to it in the *intrinſeck*. But again, if we look upon the *extrinſeck* of the *drachma Attica*, and *denarius Conſularis*, that having the ſtamp of *Athens*, and this of *Rome*, here reaſon muſt be our balance, and not the *trutina*. For the Athenian coin being a forrainer, and not currant in *Italy*, in the way of exchange, and commerce, will looſe of its primitive valuation it had at *Athens*, and for want of the *extrinſeck* of the Romane ſtamp, neceſſarily rebate in the *intrinſeck*. And therefore both Greeks, and Romanes, vvriting in *Italy* might truly ſay, that the *denarius Conſularis* and *drachma Attica*, were equall, that is, ſpeaking in *civill commerce*, and *popular eſtimation*: although they were unequall *in the intrinſeck*, and *naturall valuation*.

But if we ſhall change the ſcene, and carry the *denarius Conſularis* to *Athens*, the caſe will quite be altered. For the *denarius* being a ſtranger, and the *drachma Attica* a denizon, cannot have the ſame priviledges with this. And therefore the *extrinſeck* of the *denarius* being there of no uſe, and the *intrinſeck* in reſpect of weight falling ſhort of the *drachma*, it muſt neceſſarily

ceſſarily be much leſſe in valuation at *Athens*, then the *drachma*: and I think no adviſed Athenian, writing in *Attica*, would make them equall, I am certain no *nummularius* would.

The ſame may be ſaid of the *Hebrew ſhekel*, and *Attick tetradrachme*, and of all other coins, of diſtinct States, mentioned in claſſicall Authors. Thus *Philo*, and *Joſephus*, in *Judæa*, both truly equall the *ſhekel* to the *Attick tetradrachme*, that is, in way of commerce; though the *ſhekel* be unequall, and leſſe then the *tetradrachme* (as I have found by examining many of them) in a juſt notion of weight. The reaſon is evident by vvhat hath been expreſſed before. For in *Judæa* the *extrinſeck* makes amends, for what the *ſhekel* wants in the *intrinſeck*; and on the contrary, what the *tetradrachme* exceeds in the *intrinſeck*, is diminiſhed for want of the *extrinſeck*, till at length in a popular eſtimation they come to be equall. But the quite contrary would happen, in the tranſportation of ſhekels from *Jeruſalem to Athens*. Here the *ſhekel* would neceſſarily fall from its primitive valuation, and the *tetradrachme*, being conſidered now no longer as a forainer, would recover what it loſt in *Judæa*, and conſequently riſe above the *Hebrew ſhekel*: as having a double advantage in the *extrinſeck*, from the *State*, and in the *intrinſeck* from its weight.

But what need we to goe ſo far for examples, when as we inſtanced before, wee have them neerer home? The *Spaniſh* quarters of the dolar, or *double rials*, paſſe ordinarily in our

Sea towns but for *shillings*, (whereas they are worth in the *intrinseck* thirteen pence farthing) and our *shillings* passe in *Spain* scarce for a *rial* and an half. For theirs wanting in *England* our *extrinseck*, and ours in *Spain* wanting their *extrinseck*, must respectively rise, and fall in their valuation.

FINIS.

ſhall goe on with all poſſible expedition
per, and Volume. In the mean time, t
it, and then I ſhall not need to give y
to deſire the reſt.

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